CR-5000/8000 SERVICE NOTES

SPECIFICATIONS
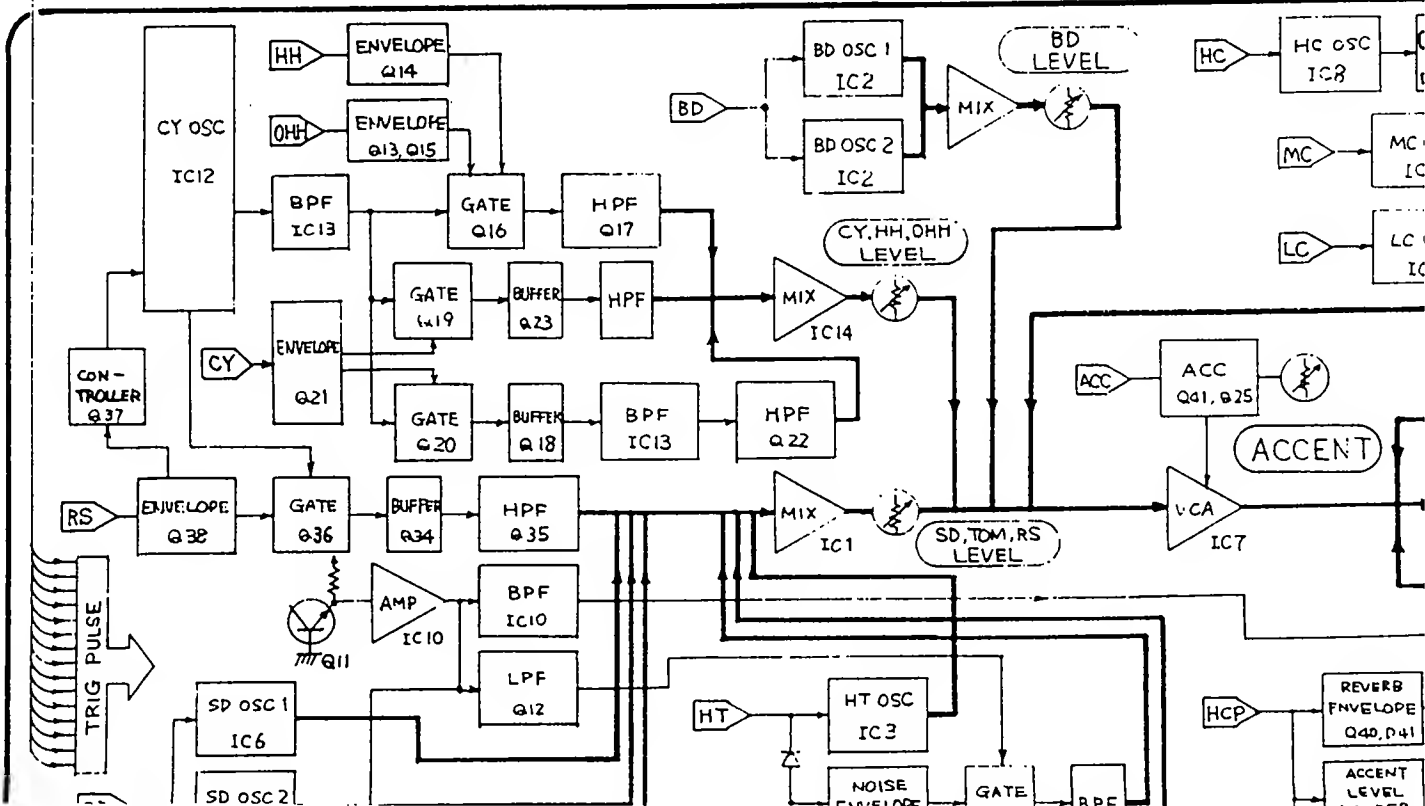
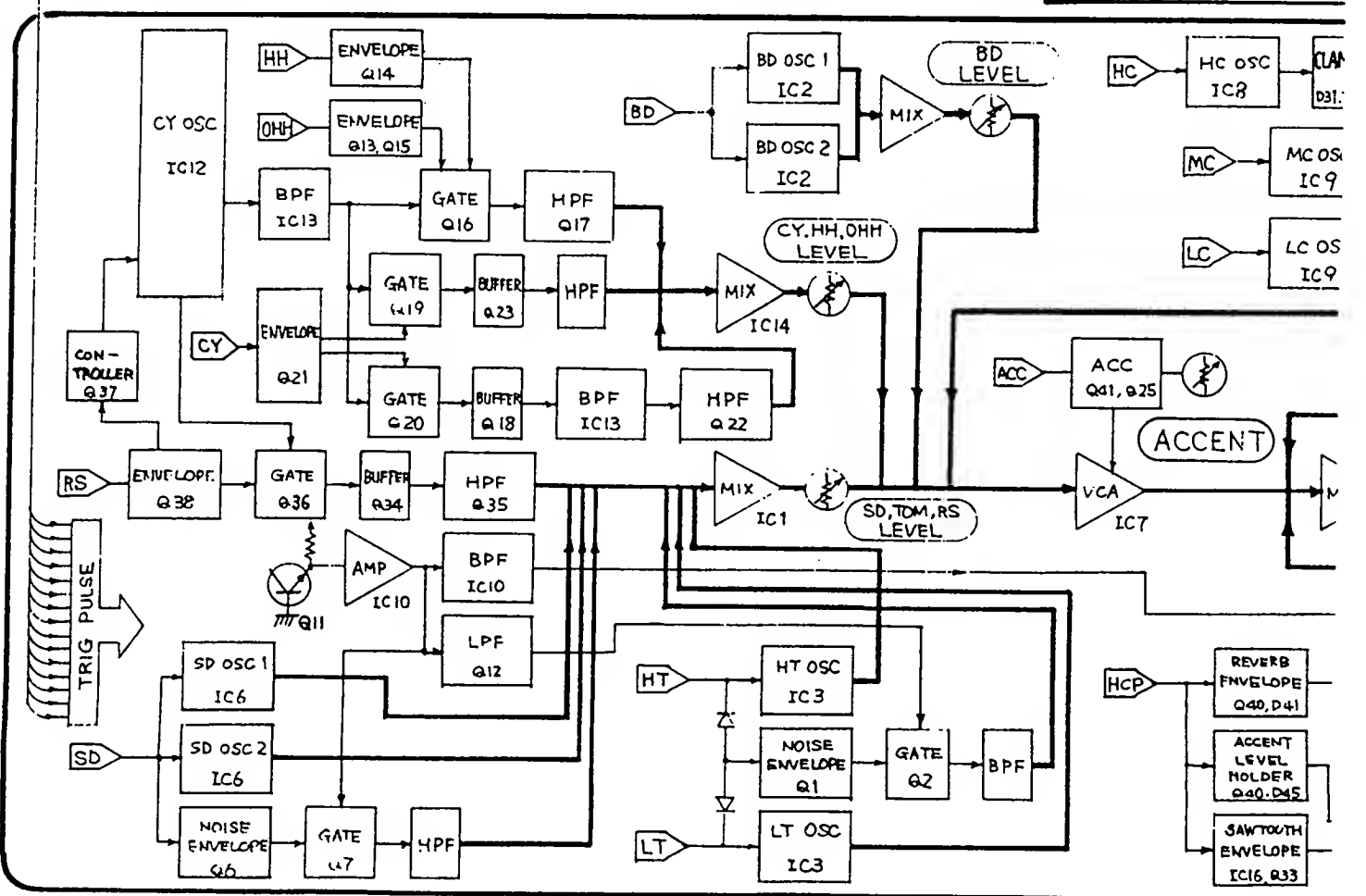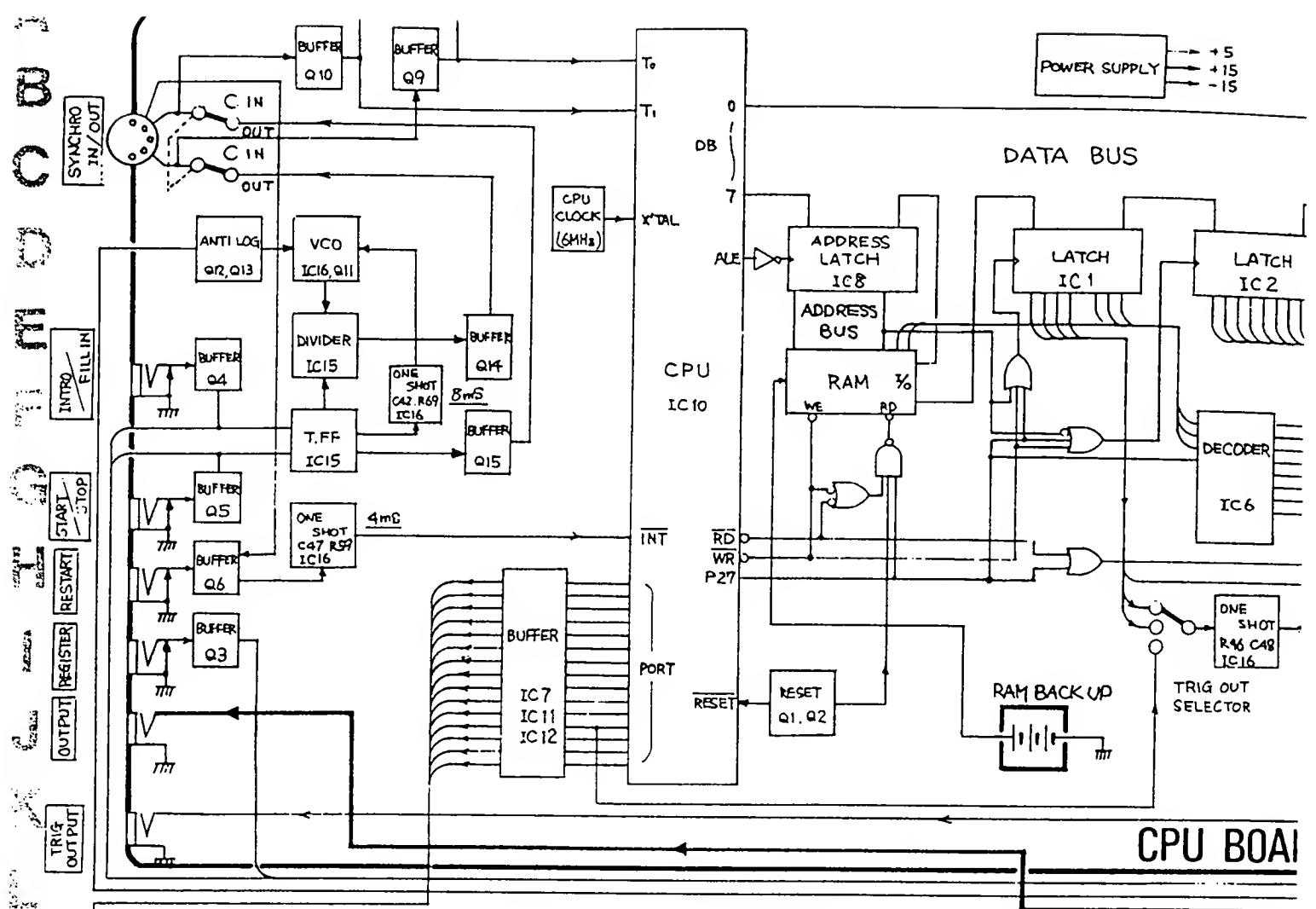OUTPUT IMPEDANCE .... Less than 6KΩ or less than 25KΩ (Serial No. CR5000 091100–, CR8000 090900–)
TRIGGER OUT .... Level: +5 positive edge
Width: 44ms (typ) @ TEMPO min./12ms (typ) @ TEMPO max.
OUTPUT (max.) .... 4V p-p @ VOICE LEVEL max./VOLUME max./ACCENT min. (16V p-p @ ACCENT max.)
(into 100KΩ)   2.5V p-p @ VOICE LEVEL mid./VOLUME mid./ACCENT mid.
(CR8000)
SYNC IN .... +15V (max.)
SYNC OUT .... +15V (Tempo clock – 6.7ms·71ms)
POWER CONSUMPTION ... CR5000: 10W, CR8000: 12W
DIMENSIONS .... 331(W) x 278(D) x 108(H)mm
WEIGHT 3.7kg
NOISE .... 0.3mV rms (–68dB) (0dB = 0.775V)
(load 100kΩ)   (DIN 45405 wtd)

Button
N-523(2247052300)

Button
N-516(2247051600)

Button
N-517(2247051700)

Button N-522
(2247052200)

Buttons
* N-520(2247052000)

N-519(2247051900)

```
** CR-5000
 * CR-8000
```

Switch
*SRM101CY15(13119806)
** SRM1018K15(13119704)

* 7-segment LED
TLR312 (15029125)
*Display window
2222030200

Pot
EVHRRA361B14(13219229)
Knob N-165(2247016500)

Panel
*2221027200
**2221026000

* N-516(2247051600)

N-521(2247052100)

Buttons
N-522(2247052200)

N-520(2247052000)

N-518(2247051800)

Switch
SRM1026K15
(13119508)

Knob
N-128(2247012800)

Button N-517(2247051700)

LED
GL-3PG2 (15029112)

ALL KEYBOARD SWITCHES: KEH10

CR-5000/8000

CPU BOARD

POWER SUPPLY → +5, +15, -15

BUFFER Q10
BUFFER Q9

SYNCHRO IN/OUT
C IN / OUT
C IN / OUT

T₀
T₁

CPU CLOCK (6MHz) → X'TAL

ALE

DB 0 / 7

DATA BUS

ANTI LOG Q12, Q13
VCO IC16, Q11
DIVIDER IC15
ONE SHOT C42, R69 IC16 8mS
BUFFER Q14
T.FF IC15
BUFFER Q15

INTRO/FILL IN
BUFFER Q4

START/STOP
BUFFER Q5
ONE SHOT C47 R59 IC16 4mS
BUFFER Q6

RESTART

REGISTER
BUFFER Q3

OUTPUT

CPU IC10

INT

BUFFER IC7 IC11 IC12

PORT

RESET

RESET Q1, Q2

ADDRESS LATCH IC8
ADDRESS BUS
RAM ½
WE   RD

LATCH IC1
LATCH IC2

DECODER IC6

RD
WR
P27

ONE SHOT R46 C48 IC16
TRIG OUT SELECTOR

RAM BACK UP

TRIG OUTPUT

CY OSC IC12

HH → ENVELOPE Q14
OHH → ENVELOPE Q13, Q15

BPF IC13
GATE Q16
HPF Q17

BD → BD OSC 1 IC2 / BD OSC 2 IC2 → MIX → BD LEVEL

HC → HC OSC IC8
MC → MC IC
LC → LC IC

CON-TROLLER Q37
CY → ENVELOPE Q21
GATE Q19 → BUFFER Q23 → HPF → MIX IC14 → CY, HH, OHH LEVEL
GATE Q20 → BUFFER Q18 → BPF IC13 → HPF Q22

ACC → ACC Q41, Q25
ACCENT

RS → ENVELOPE Q38 → GATE Q36 → BUFFER Q34 → HPF Q35

MIX IC1 → SD, TOM, RS LEVEL

VCA IC7

TRIG PULSE

AMP IC10 → BPF IC10 / LPF Q12
Q11

SD OSC 1 IC6
SD OSC 2

HT → HT OSC IC3

NOISE ENVELOPE → GATE → BPF

HCP → REVERB ENVELOPE Q40, D41
ACCENT LEVEL

19 20 21 22 23 24 25 26 27 28 29 30 31

+5
+15
-15

BUS BUFFER IC1 IC2

BUFFER IC2

S1
S2
S30
S31

LATCH IC2

BANK S11 12.13

PRESET S14 ~ S21

PROGRAM S22 ~ S29

ARRANGE S3 ~ S10

INTRO FILL IN

AUTO FILL IN MEASURES

DECODER IC6

LED DRIVER Q1~Q8

D1.2   D11.12.13   D14 ~ D21   D22 ~ D29   D3 ~ D10   D32

ONE SHOT R46 C48 IC16

BUFFER Q7

TRIG OUT SELECTOR

LED DRIVER Q9   TEMPO

LED DRIVER Q10   BEAT

S1 : REGISTER, ♪
S2 : CRASH, ♩
S30 : INTRO/ FILL IN
S31 : START/ STOP

CPU CLOCK (6MHz)

X'TAL

T. INT

CPU IC3

P27
P25

P16

P10

LED DRIVER Q18~Q20

LED DRIVER Q11~Q17

TEMPO

PU BOARD   CONTROL BOARD   LED BOARD

CR-8000 BLOCK DIAGRAM

HC OSC IC8

CLAMP D31.32

CONGA LEVEL

MC OSC IC9

MIX IC8

LC OSC IC9

CB   ENVELOPE Q3

CB OSC1 IC4   GATE Q4

CB OSC2 IC4   GATE Q5

BPF IC5

CB. CLAVES LEVEL

MIX IC5

C   CLAVES OSC Q8. Q9

VOLUME

ENT

MIX IC11

MUTING Q30.31.32

PROGRAM MODE

INSTRUMENT SELECTOR

REVERB ENVELOPE Q40. D41

GATE Q29

ACCENT LEVEL

POWER SUPPLY → +5 +15 -15

DATA BUS

BUS BUFFER IC1 IC2

S1 S2 S30 S31
BUFFER IC2

BANK S11.12.13
PRESET S14 ~ S21
PROGRAM S22 ~ S29
ARRANGE S3 ~ S10

INTRO / FILL IN
AUTO FILL IN MEASURES

LATCH IC1
LATCH IC2
DECODER IC6

D1.2
D11.12.13
D14 ~ D21
D22 ~ D29
D3 ~ D10
D32

LED DRIVER Q1~Q8

1 BACK UP

ONE SHOT R46 C48 IC16
BUFFER Q7

TRIG OUT SELECTOR

LED DRIVER Q9 TEMPO
LED DRIVER Q10 BEAT

TEMPO

S1 : REGISTER, ♪
S2 : CRASH, 𝅗𝅥
S30 : INTRO / FILL IN
S31 : START / STOP

CPU CLOCK (6MHz)
X'TAL
Ti INT
CPU IC3
P27 P25
P16
P10

LED DRIVER Q18~Q20
LED DRIVER Q11~Q17

CPU BOARD   CONTROL BOARD   LED BOARD

HC → HC OSC IC8 → CLAMP D31.32
MC → MC OSC IC9 → MIX IC8 → CONGA LEVEL
LC → LC OSC IC9

CB → ENVELOPE Q3
CB OSC 1 IC4 → GATE Q4
CB OSC 2 IC4 → GATE Q5
BPF IC5
MIX IC5 → CB. CLAVES LEVEL
C → CLAVES OSC Q8.Q9

ACC Q41, Q25
VCA IC7

VOLUME

ACCENT

MIX IC11 → MUTING Q30.31.32

PROGRAM MODE

INSTRUMENT SELECTOR

HCP → REVERB ENVELOPE Q40, D41
ACCENT LEVEL HOLDER Q40, D45
SAWTOOTH ENVELOPE IC16, Q33
GATE Q29
VCA
HCP LEVEL

VOICE GENERATOR BOARD

CR-80
BLOCK
DIAGRAM

CR-5000 CR-8000
FUNCTIONAL DIAGRAM

Fig. 1

Fig. 2

CIRCUIT DESCRIPTION

SWITCH SCANNING

CPU holds one of switch matrix rows low through LATCH IC1 and DECODER IC6.
Exp. When S11 closes while pin 4 of IC6 (B in Fig. 1) is held low, pin 14 of BUFFER IC1 (A in Fig. 1) which is pulled up via R1, becomes low. This low is read by CPU through data bus.
CPU continues this sequence for the remaining 7 matrix rows ((B) , Fig.2).
Once rhythm starts, time interval between switch scanning varies to Tempo Clock rate.

LED DINAMIC SCANNING

To light LED that is on, CPU selects matrix row and column where the LED is connected diagonally.
In the above example D11 has been on, CPU fires LED driver Q1 through LATCH IC2 in sympathy with low at B in Fig. 1 ((A) and (D) in Fig. 2.)

Lengths of lows and intervals between lows in Fig. 2 also vary greatly with controls setting and rhythm tempo.

VOICE TRIGGER SIGNAL

CPU delivers trigger signals (negative going) to individual VOICE Generators.
Trigger signal goes negative at the falling edge of tempo clock and stays low until the next falling edge of the tempo clock. That is, width of trigger signal is equal to period of one clock signal. The maximum trigger signal rate is $\frac{24 \ clocks}{4}$:(♪).

EXT TRIGGER   Derived from LATCH IC1 on CPU board. They are also negative going and the pulse width is equal to that of tempo clock.

RESTART

CPU reads INT terminal (not in use for interrupt application) every 3ms and , when INT is high, resets internal counter to revert to onset of a measure.
If monostable (1/6IC6, C47 and R59) output is high for a period shorter than 3ms or

:E GENERATORS

t voice generators are designed based on a fashion
ilar to those detailed in the circuit description
the TR-808 Service Notes which is expected to be
erenced to as necessary. Exceptions are Cymbal and
Shot. Below brief comments on individual voices.

circuit consists of two bridged-T networks.

ɔ has two bridged-T filters for drum sound, in
ition, noise generator for snare sound.

IT:

lged-T networks in these stage include two diodes
;heir RC constant loop. The diode changes con-
;ing rate in proportion to sound amplitude passing
ɔugh the network, changing filter characteristic,
; shifts filter response curve (frequency) along
ld contour. Pink noise is combined with this out-
to simulate reverbration.

IC. HC

ɔ based on Bridged-T. HC output is clamped on D31
D32 to have multiple harmonics to emphasis highs.

)HH. CY

combined square waves from Shmitt triggers
are gated at choppers with the contour
ɔed by respective envelop generator outputs.

ig six Schmitt triggers, two are used which
reset by an RS trig fed through Q37. The
;t rising edge of two outputs are synchro-
:d to each other to eliminate unsavory sound
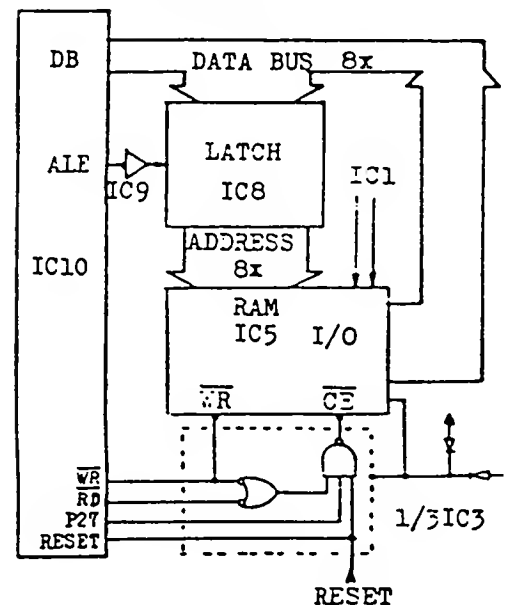;he very first of RS note.

CB

Two oscillator outputs of
frequency are summed at B:
gated at choppers.

HCP

HCP sound is accomplished
lating white noise with sɛ
waves derived from IC6.

RAM
CR-8000 only

NOTES:
P27 - high during RAM accessin(
$\overline{CE}$ - high during power off

outputs of different

summed at BPF after

rs.

complished by modu-

ise with sawthooth

rom IC6.

ACCENT

Sounds passing through VCA IC7 are accentuated simaltenously when an accent pulse is applied to Q41 with its amplitude determined by VR8 setting.
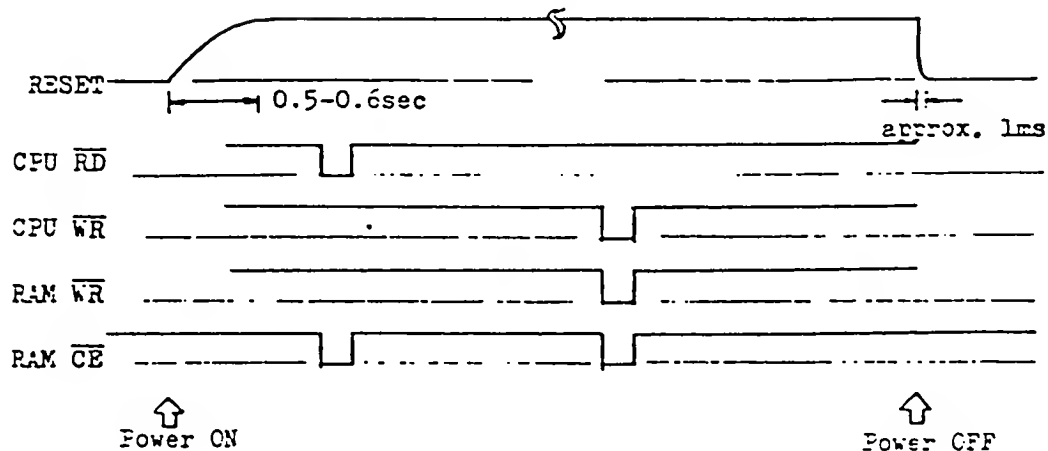
C (CLAVES)

The circuit is designed based on conventional R-C phase oscillator.

RESET — 0.5-0.6sec

approx. 1ms

CPU $\overline{RD}$

CPU $\overline{WR}$

RAM $\overline{WR}$

RAM $\overline{CE}$

Power ON

Power OFF

8x

IC1

I/O

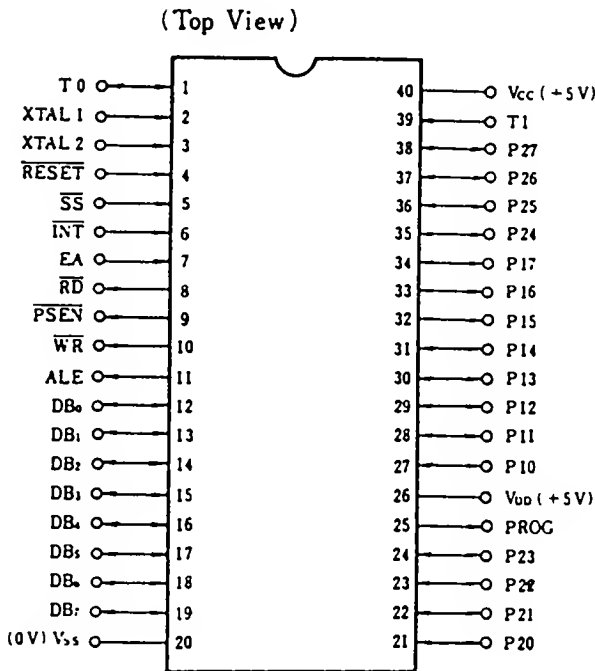$\overline{CE}$

1/3IC3

RESET
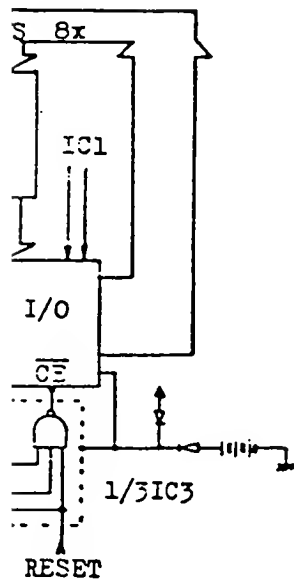
RAM accessing
power off

Storage for programmed rhythm patterns are provided for the CR-8000. The memories are maintained by backup batteries (three 1.5V dry cells).
The ten address bits are required to access to a memory location on 1024 words by 4 bit RAM uPD444; 8 bits are latched into IC8 by ALE and 2 bits into IC1 (also used for switch scanning).

μPD8049C/μPD8048C

SINGLE COMPONENT 8-BIT MICROCOMPUTER

(Top View)

T 0	1	40	Vcc (+5 V)
XTAL 1	2	39	T1
XTAL 2	3	38	P 27
RESET	4	37	P 26
SS	5	36	P 25
INT	6	35	P 24
EA	7	34	P 17
RD	8	33	P 16
PSEN	9	32	P 15
WR	10	31	P 14
ALE	11	30	P 13
DB0	12	29	P 12
DB1	13	28	P 11
DB2	14	27	P 10
DB3	15	26	VDD (+5 V)
DB4	16	25	PROG
DB5	17	24	P 23
DB6	18	23	P 22
DB7	19	22	P 21
(0 V) Vss	20	21	P 20

8049
2K × 8 ROM
128 × 8 RAM

8048
1K × 8 ROM/EPROM
64 × 8 RAM

BLOCK DIAGRAM

	1024 WORDS	8048	64 WORDS
CLOCK	2048 WORDS PROGRAM MEMORY	8049	128 WORDS DATA MEMORY

8-BIT CPU

8-BIT TIMER/ EVENT COUNTER

27 I/O LINES

μPD8049C

PIN NAME	PIN NO.	FUNCTION
TØ	1	TEMPO CLOCK IN
T1	39	START/STOP SIGNAL IN
INT	6	RESTART SIGNAL IN
DATA BUS	12-19	SWITCH SCANNING OUT/IN LEDs LIGHT OUT TEMPO LED, TRIG OUT MEMORY READ/WRITE (CR-8000 only)
PORT 1		TRIGGER OUT FOR VOICE GENERATOR
P10	27	CYMBAL
P11	28	HI TOM
P12	29	OPEN HI-HAT
P13	30	LOW TOM
P14	31	HI-HAT
P15	32	SNARE DRUM
P16	33	BASS DRUM
P17	34	ACCENT
PORT 2		TRIGGER OUT FOR VOICE GENERATOR
P20	21	HI CONGA
P21	22	MIDDLE CONGA
P22	23	LOW CONGA
P23	24	COWBELL
P24	35	CLAVES
P25	36	RIM SHOT
P26	37	HAND CLAP
P27	38	I/O SELECT

uPD8049C-159
uPD8049C-232 (improved version)

The following program bug is eliminated in the -232 version.

Condition
SHUFFLE ON with alternate rhythm patterns selected.
INTRO/FILL IN is pushed after the termination of first measure pattern.

When INTRO/FILL IN part ends, CPU delivers rhythm pattern data for the first measure but replaces the first step data only with the one for the second measure.
This is perceptive in RHUMBA, BEGUINE or

μPD8048C   CR-8000 only

PIN NAME	PIN NO.	FUNCTION
TØ	1	NO APPLICATION (KEPT LOW)
T1	39	TEMPO CLOCK IN
INT	6	START/STOP SIGNAL IN
DATA BUS	12	KEPT HIGH for Internal
	13	KEPT LOW program
	14	KEPT LOW initialization
	15	KEPT LOW
	16-19	NO CONNECTION
PORT 1		
P10	27	
P11	28	
P12	29	7-SEGMENT LED LIGHT
P13	30	SIGNAL OUTPUTS
P14	31	
P15	32	
P16	33	
P17	34	NO CONNECTION
PORT 2		
P20-P23	21-24	NO CONNECTION
P24	35	(NOT IN USE)
P25	36	7-SEGMENT LED
P26	37	CONTROL SIGNAL
P27	38	OUTPUT

TEMPO DISPLAY (CR-8000 only)

uPD8048C IC3 on Control Brd counts
Tempo Clocks derived from Q9 on
CPU Brd whenever power is being
fed to the CR-8000.
Since 24 tempo clocks are made
equal to one ♩, actual tempo dis-
played is

$$\frac{\text{clocks per minute}}{24}$$

CPU performs an equivalent eq.
in a short period and drives
Q18-Q20 on Control Brd in syn-
chronous with drive signals for
7 segments of display LEDs.
Upon rhythm running INT of CPU
IC3 goes and stays negative with
which CPU's internal count gate
is disabled, then re-started
at the first falling edge of the
next tempo clock. This count
break allows CPU to skip tran-
sitional tempo clock that is
reset by a start signal.
If INT remains high after
rhythm running, tempo display
varies temporarily.

CONTROL BOARD

CPU BOARD   GL 3125-060

REFER TO CR-5000 CKT
FOR AC WIRINGS.

		F1	F2
100 V			jumper
117 V			
220v, 240v		CEE T1A	CEE T 400
240v 3P		CEE T1A	CEE T 400

SYNC. IN/OUT

1. START/STOP
2. GND
3. TEMPO CLOCK
4. NC
5. NC

IC 10
μPD 8049C
-159
or -232
see p.5

X1 : FCR·6

PRI : ERS-C33G561

R52, R53, RM8 · 273K

JK4 INTRO/FILL IN

JK2 START/STOP

JK3 RESTART

JK5 REGISTER

JK1 OUTPUT

JK6 TRIGGER OUTPUT
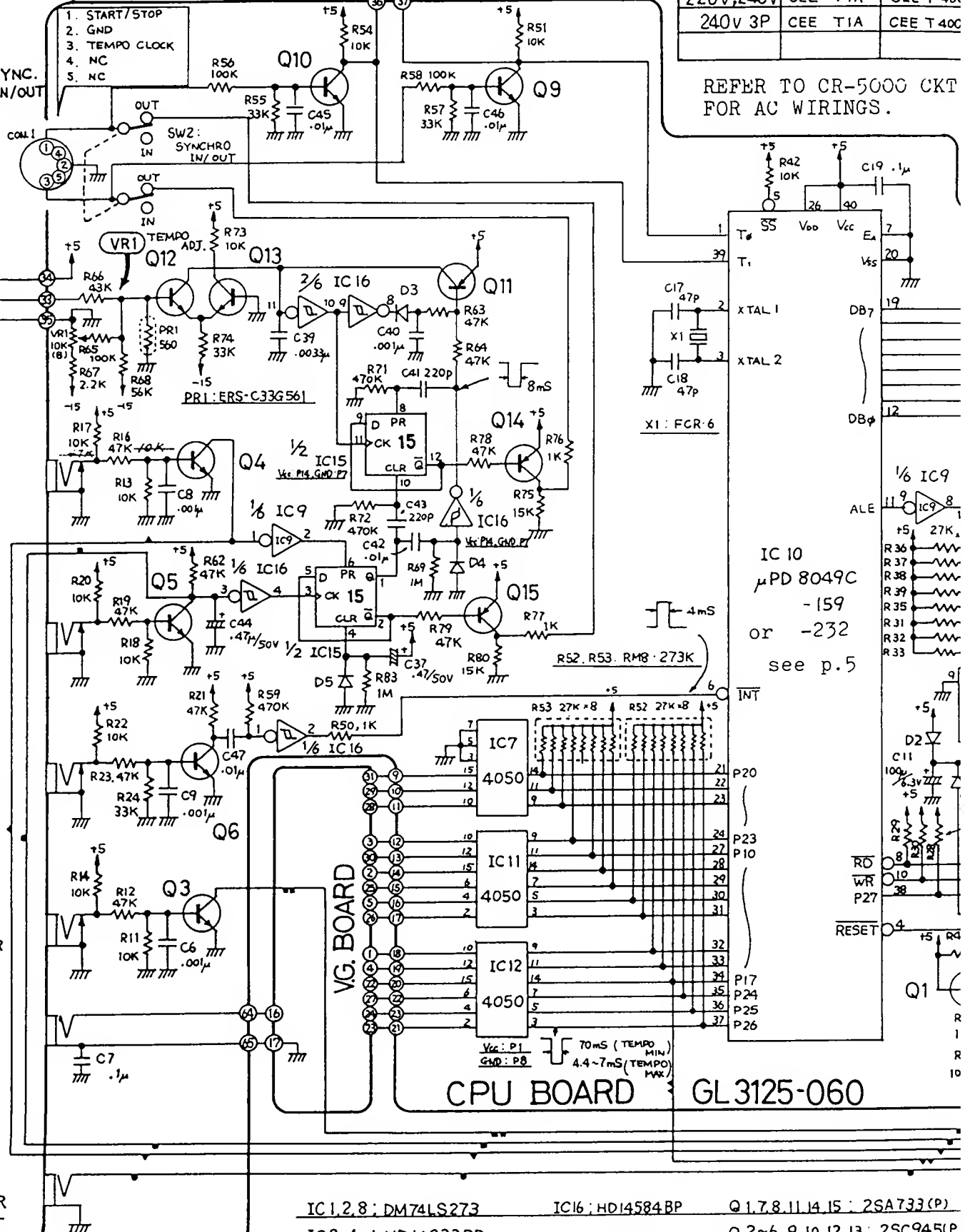
IC 1,2,8 : DM74LS273   IC16 : HD14584BP   Q 1,7,8,11,14,15 : 2SA733 (P)
IC3,4 : HD14023BP   Q 2~6,9,10,12,13 : 2SC945(P.
IC7,11,12 : HD14050.BP   Q 16 : 2SB596 (o)

Sec. Wirings Ratings(DC): ±23V @120mA, 10V @700mA

F2	F3
umper	
EE T400mA	CEE T400mA
E T400mA	CEE T400mA

CKT DIA

V.G. BOARD

R41 27K x 8

R41: RM8-273K

R41: RM8·273K

IC13 7805

Q16

IC14 TA7179P

Q17

IC9

IC8 LS273

IC1 LS273

IC2 LS273

IC4

IC5 μPD444C

IC6 7445

IC3

SW1

SW1 TRIGGER OUT SELECTOR

R40: RM8·472K

Q8

⅙ IC16

Q7

Q2

UM3(1.5V) x3
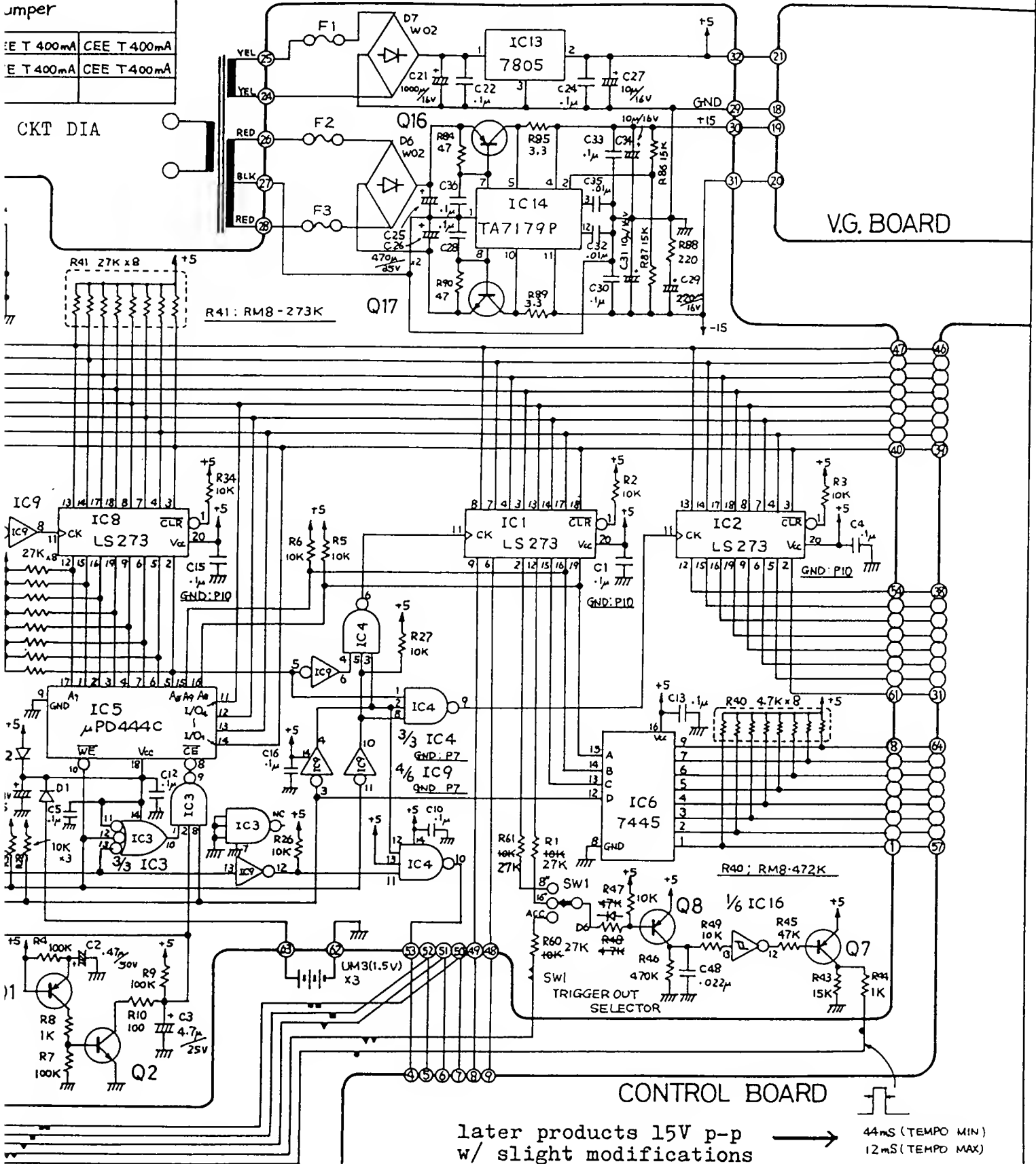
CONTROL BOARD

later products 15V p-p ⟶
w/ slight modifications

44mS (TEMPO MIN)
12mS (TEMPO MAX)

CR-8000 CPU

(P)

45(P)
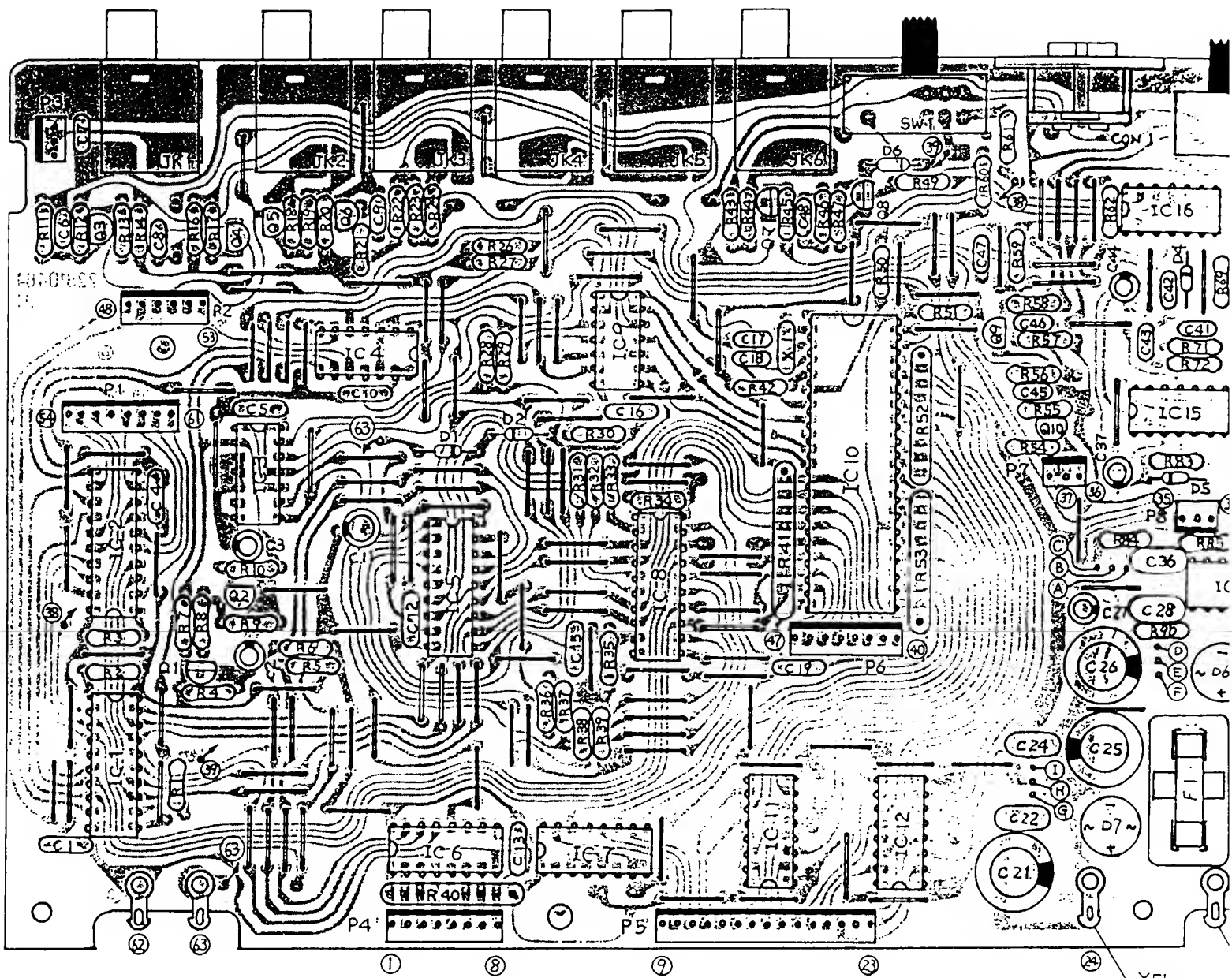
MODIFICATIONS ON FOIL SIDE
for PCB NO. 2291046400

pattern cut

cut

jumper

21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

TEMPO ADJ.
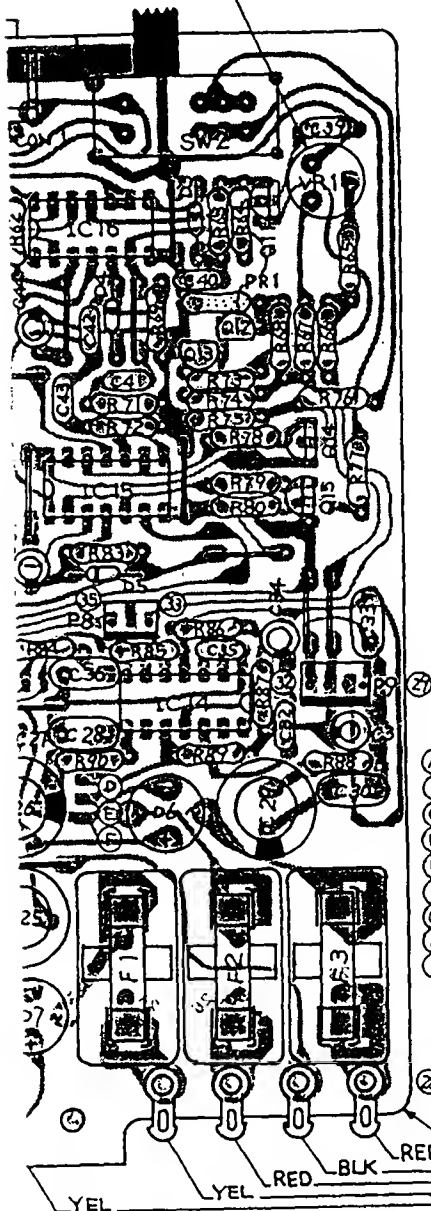
CR-8000
CPU BOARD

GL3125-060
(731250600)
(pcb 2291046401)

	2SC 945 P
	2SA 733 P
DS 442 or	1S2473 / 1S1588
	Posistor ERS-C33G561
X 1	Ceramic Resonator

Resistor Array
R40, R41 R52 R53

COMMON

| | 0.1μF Ceramic |
| | 0.1μF Mylar |

Q16

Q17

IC13

220v , 240v

RED
RED   BLK   RED
YEL   YEL

100v , 117v

CHANGES IN COMPONENTS

Ensure trigger outputs
at IC1 when low V_{OH}

LS273 is used.

R47	47k	to	10k
R48	47k	to	D6
R1	10k	to	27k
R61	10k	to	27k
R60	10k	to	27k
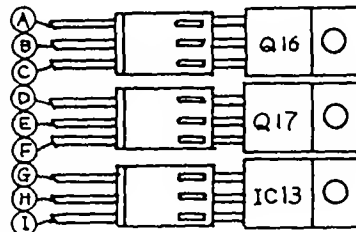
CONTROL BOARD   GL3125-090 (7312509008)   (pcb 2291
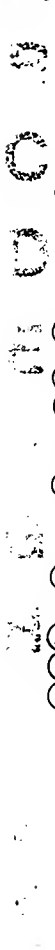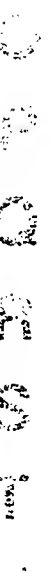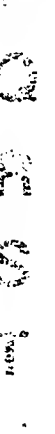
LED BOARD

(7312511001)
(pcb 2291046<u>00</u>)

MAX (mm)
15.3

8

LED BOARD
on early products
pcb 2291046600
                ↑
without underscore
Pattern cuts, Jumpers
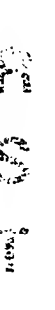
1046501)   Serial Number 142650 and higher

(Viewed from the rear)
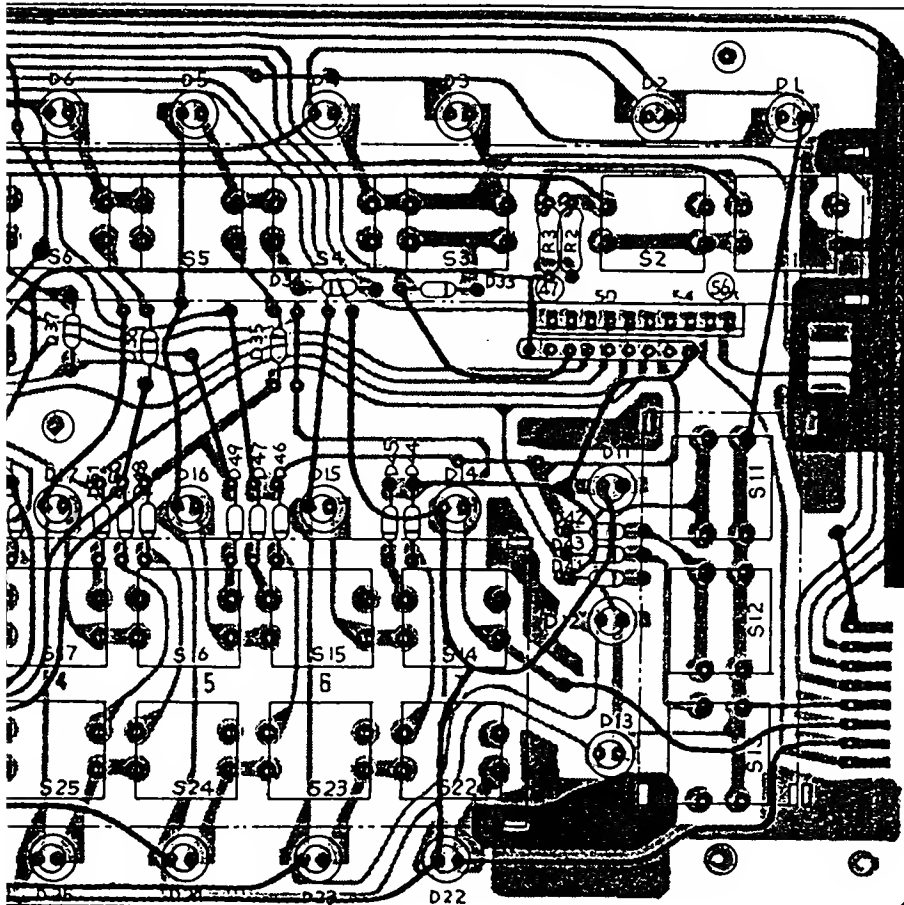
Refoer to p.16 for
pcb 2291046500:
surface mounting
jumper wire.

57

CR-8000

S30
S31

D1

ANODE
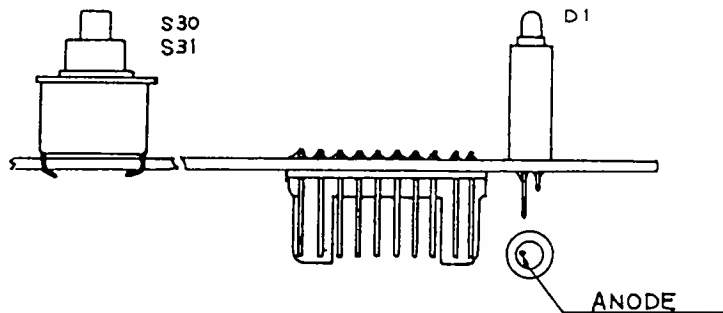
⎓▭⎓ :	DS 442 or 1S1588 , 1S2473
▽ :	2SA 733 P or 2SA1015 GR
▭ :	2SA 937 Q
▭ :	2SC 2021 R
X1 :	CERAMIC RESONATOR (6.0MHz) FCR-6
◎ :	LED GL-3PR2 (RED)
⊘ :	LED GL-3PG2 (GRN)

CONTROL BOARD
GL3125-090

IC1, IC2 : HD14503BP

Q1 ~ Q10 : 2SA733-P or 2SA1015-GR

Q11 ~ Q17 : 2SA937-Q

Q18 ~ Q20 : 2SC2021-R

LED : D1 ~ D30, 32 : (RED) GL-3AR2

LED : D31 : (GRN) GL-3PG2

D33 ~ D83 : 1S2473 or 1S1588 or DS·442

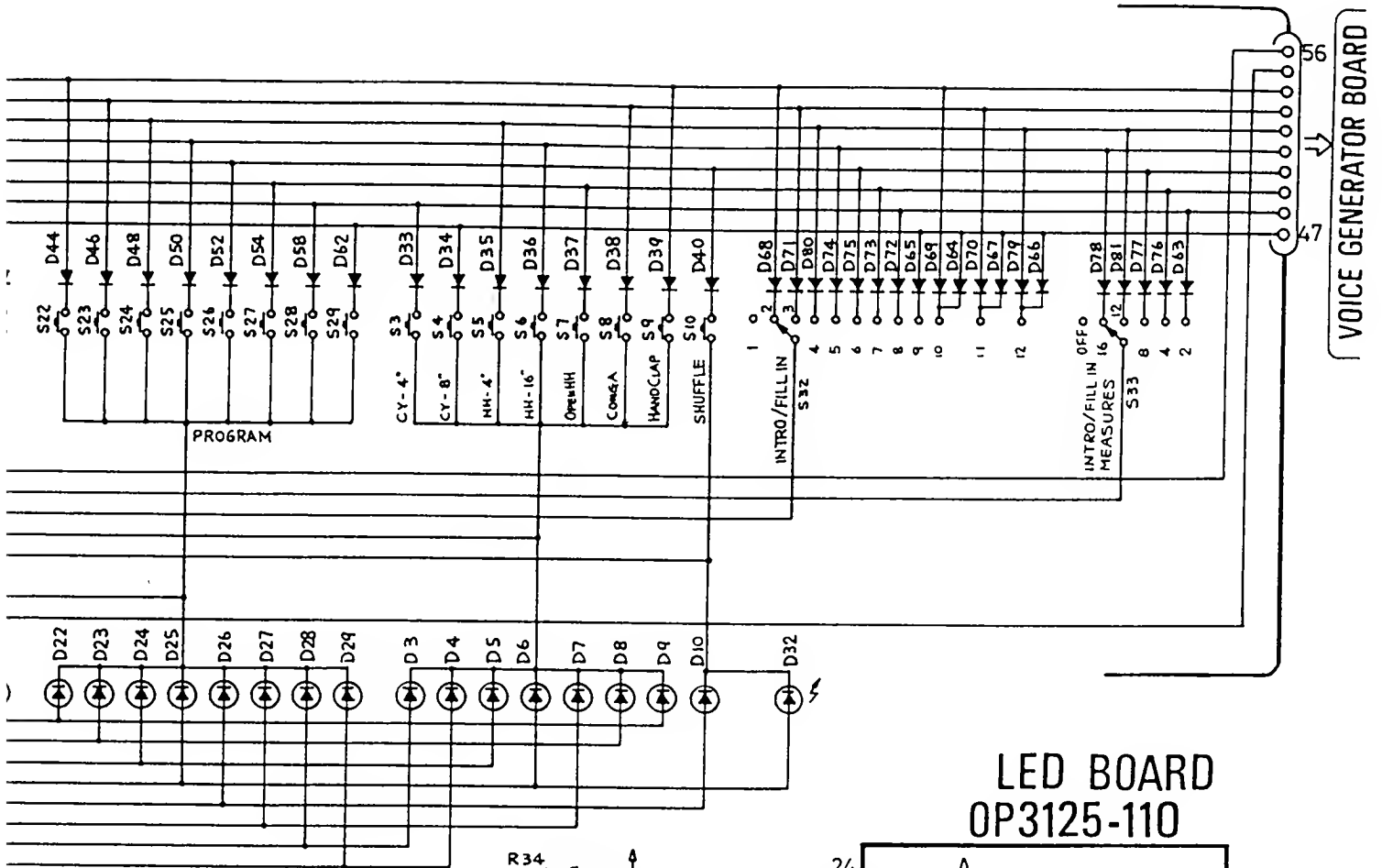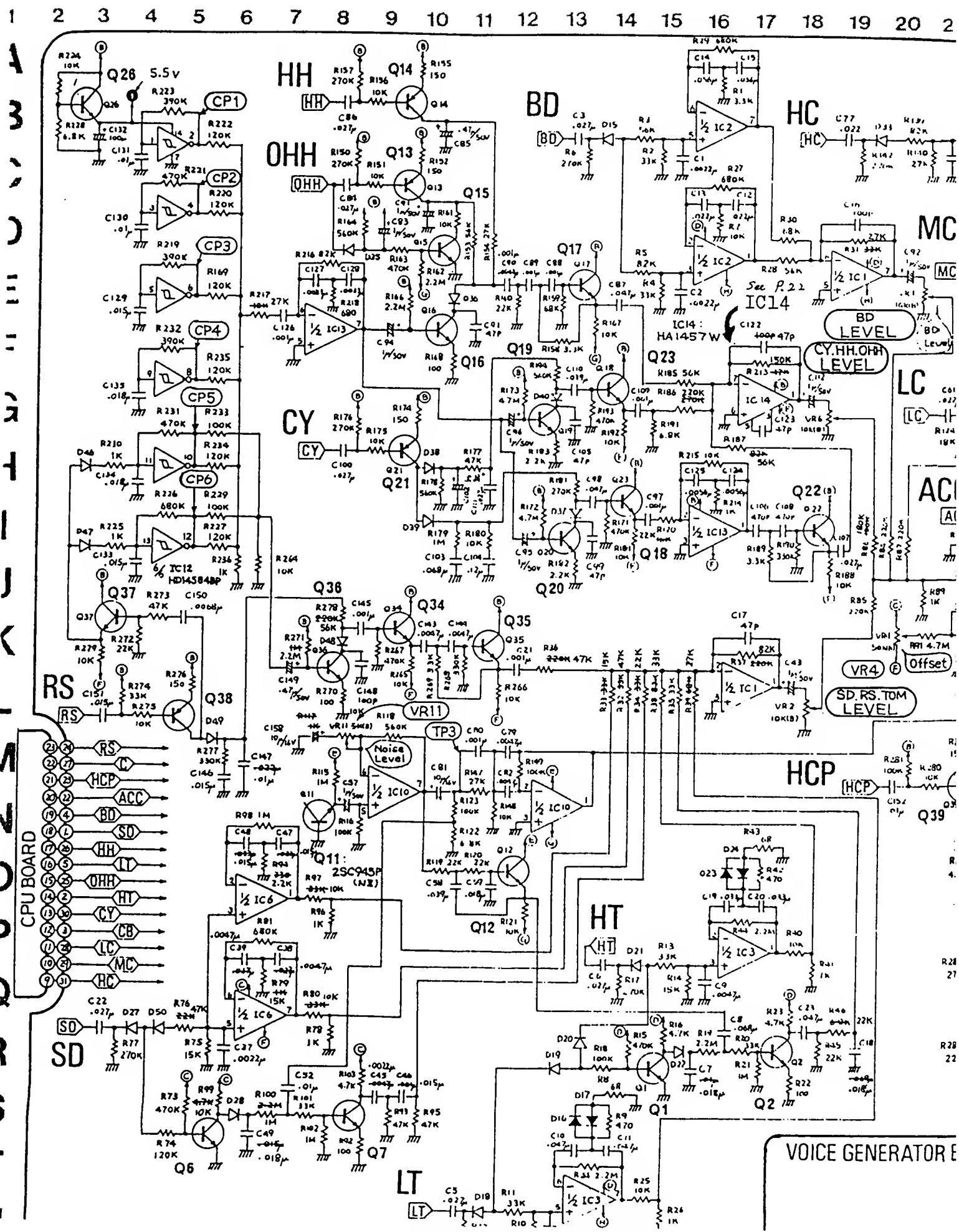CERAMIC RESONATOR : (6.0 MHz) FCR-6/TDK
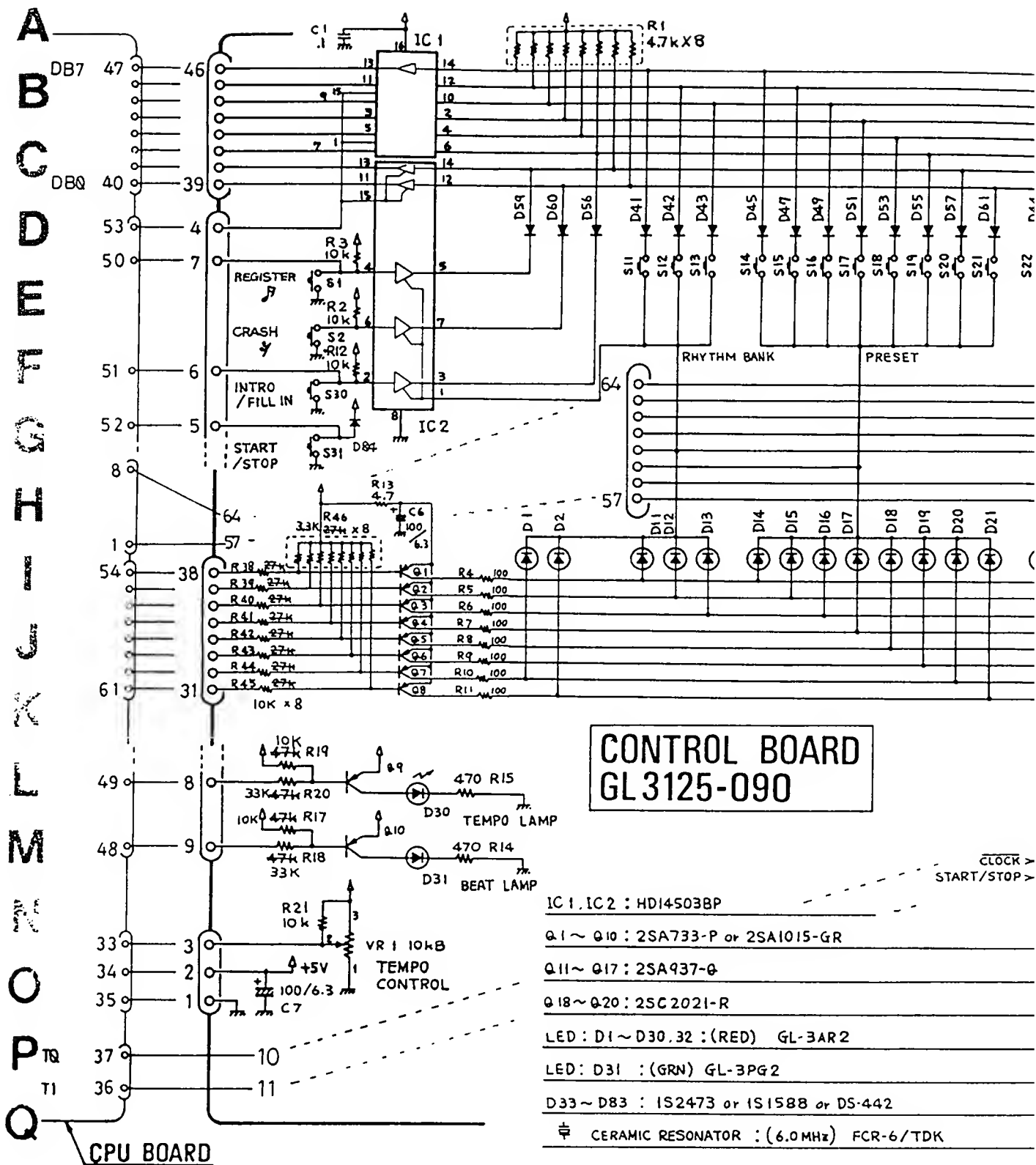
CHANGES IN RESISTANCE   With Serial Number 090900 and up
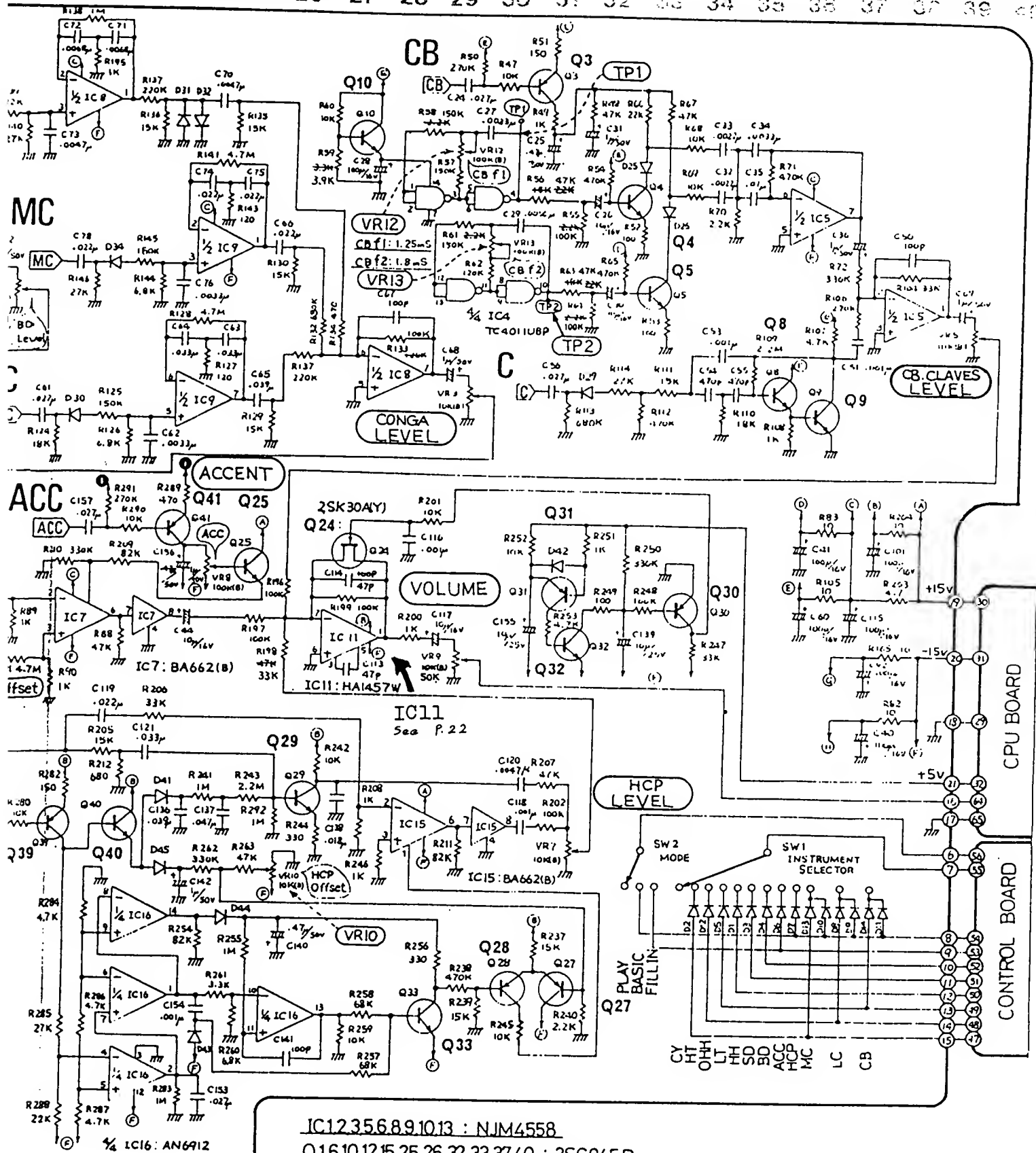
The changes eliminates possible dim lighting of LEDs due to insuffi
at IC1 or IC2 on CPU board:

R38-R45: 27k to 10k   R17, R19: 47k to 10k   R18, R20: 47k to 3
Resistor Array R46: 27k to 3.3k

19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 3

VOICE GENERATOR BOARD

56

47

D44 D46 D48 D50 D52 D54 D58 D62

S22 S23 S24 S25 S26 S27 S28 S29

D33 D34 D35 D36 D37 D38 D39 D40

S3 S4 S5 S6 S7 S8 S9 S10

CY-4" CY-8" HH-4" HH-16" OpenHH Conga/A HandClap SHUFFLE

PROGRAM

D68 D71 D80 D74 D75 D73 D72 D65 D69 D64 D70 D67 D79 D66

INTRO/FILL IN
S32

1 2 3 4 5 6 7 8 9 10 11 12

D78 D81 D77 D76 D63

INTRO/FILL IN
MEASURES
S33

16 12 8 4 2 OFFO

D22 D23 D24 D25 D26 D27 D28 D29

D3 D4 D5 D6 D7 D8 D9 D10

D32

LED BOARD
OP3125-110

R34
R35
R36
2.7k x3

R33 1K
R32 1K
R31 1k

Q18 22
Q19 21
Q20 20

24

C5 .1
47P C3
47P C2
2.2γ50v C4

D83

D82

To
X1
X2

RESET
SS
INT

EA

Vcc 40
T1 39
P27 38
P26 37
P25 36

R22
4.7
100/6.3
C8

100 10 1

8 8 8

μPD8048C-305

IC 3

ICK > 10
TOP > 11

DB0 12
DB1 13
DB2 14
DB3 15

20

P16 R30
R29
R28
P10 R27
R26
R25
R24

4.7k x8

27k x8
R23

26*

Q17 18 100 R57
Q16 100 R56
Q15 100 R55
Q14 100 R54
Q13 100 R53
Q12 100 R52
Q11 12 100 RS1

g
f
e
d
c
b
a

8

26
R61
R60
R59
R58

28
29
27

25 10k x4

ficient H level output

33k

CR-8000 CONTROL

VOICE GENERATOR B

CB

MC

ACC

ACCENT

CONGA LEVEL

CB.CLAVES LEVEL

VOLUME

HCP LEVEL

VR12
CBf1: 1.25mS
CBf2: 1.8 S

VR13

TP1
TP2

4/4 IC4
TC4011UBP

2SK30A(Y)

IC11
See p.22

IC7: BA662(B)
IC11: HAI457W
IC15: BA662(B)
4/4 IC16: AN6912

SW2 MODE
SW1 INSTRUMENT SELECTOR

PLAY
BASIC
FILLIN

CY HT OHH LT HH SD BD ACC HCP MC   LC   CB

+15v
-15v
+5v

CPU BOARD
CONTROL BOARD

OR BOARD   VG3125-120

IC 1.2.3.5.6.8.9.10.13 : NJM4558
Q 1.6.10.12.15.25.26.32.33.37.40 : 2SC945P
Q 2.4.5.7~9.16~20.22.23.29.34~36 : 2SC 732 TM GR
Q 3.13.14.21.27.28.30.31.38.39.41 : 2SA733P
D 16.17.23.24 : 1S188FM
D 1~15.18~22.25~50 : DS442 , 1S2473 or 1S1588
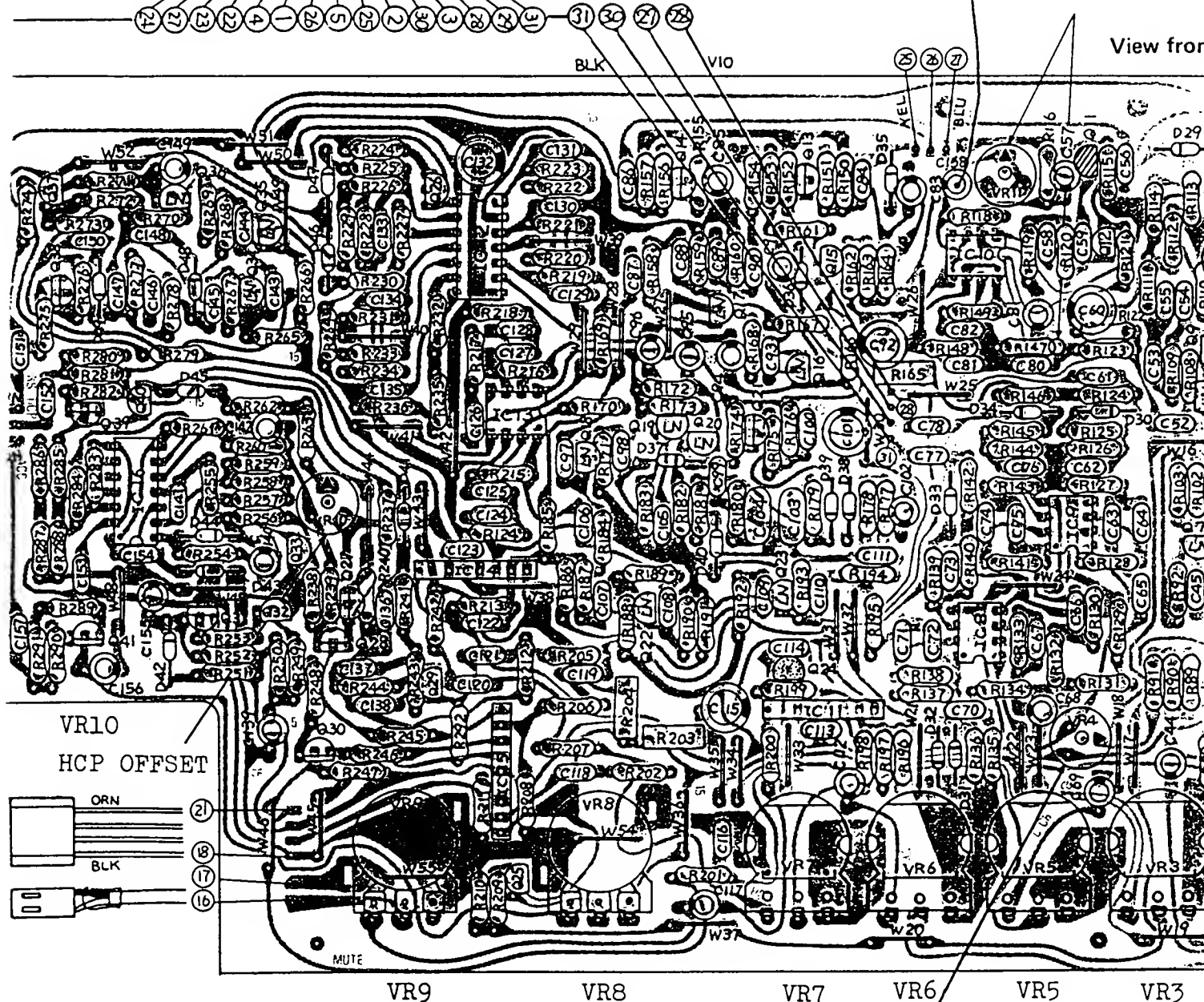
3 4 5 6 7 8 9 10 11 12 13 14 15 16 18 19 20

early PCB: R117 1kΩ
S/N 101300-: C158

VR11 TP-3
NOISE LEVEL

View from

BLK VIO

YEL BLU

VR10
HCP OFFSET

ORN

BLK

VR9 VR8 VR7 VR6 VR5 VR3

VR4 OFFSET
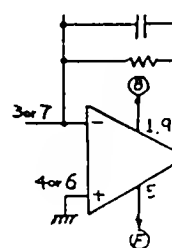
surface
mounting
on PCB
2291046301
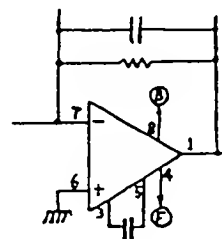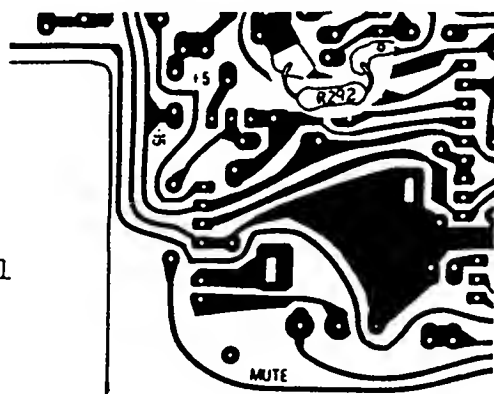
IC11, IC14

HA1457W (8 pins) or NJM4558S

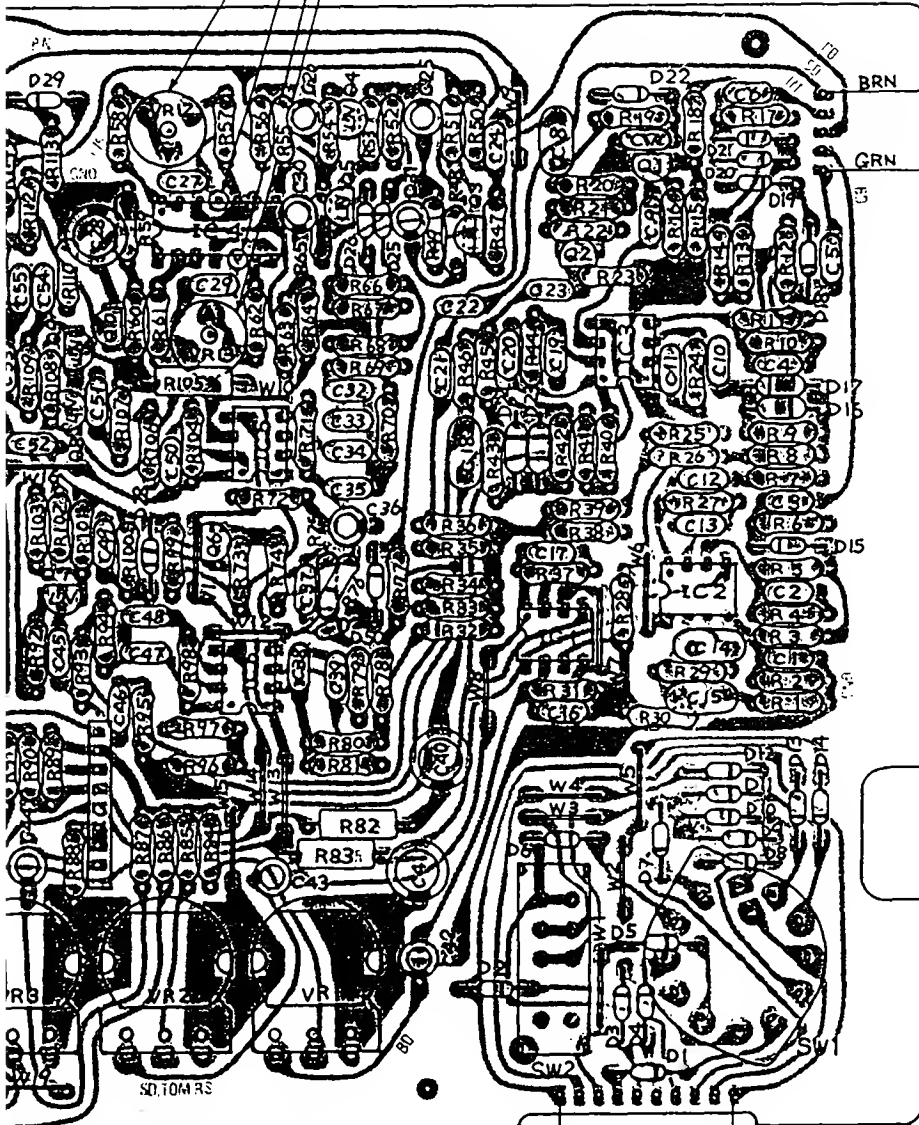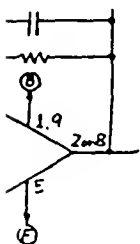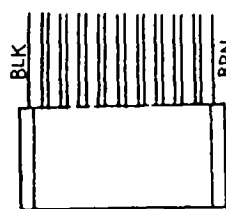1 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

VR12 TP-1
CB FREQ

VR13 TP-2
CB FREQ

from foil side

◯	2SC945-P
Ⓛ	2SC732TM-GR
◠	2SA733-P
◪	2SC945-P(NZ)
◉	2SK30A-Y
⊸▭⊸	DS442, 1S2473 or 1S1588
⊸◨⊸	1S188FM

BRN ①
GRN ⑤

CR-8000
VOICING BOARD
VG3125-120
(7312512007)
(pcb 2291046302)

CHANGES IN COMPONENTS

with S/N 090900
VR9 from 10k to 50k
Eliminates whizz sound
upon power off.

with S/N 101300
R198(HCP) 47k to 33k

with S/N 111700
R55,56,58,61,63,64
resistances are increased
to limit currents into
IC4. This modification is
mandatory when replacing
defective IC4.

ALSO SEE CR-5000 VG BRD
LAYOUT FOR OTHER MODIFI-
CATIONS.

R3   VR2   VR1   ⑮   ⑥

BLK   BRN

3S (9 pins) (See p. 22 for detail.)

ADJUSTMENTS

CPU BOARD

RAM BACK UP BATTERIES (CR-8000 only)
Power switch must be turned OFF.
Connect 100 ohms across pins 18 (Vcc) and 9 (GND) of RAM IC5 or shunt meter
(scope or voltmeter) inputs with 100 ohms. Confirm approx. 4V at pin 18.

TEMPO CLOCK

Allow at least 10 minutes for circuit thermal stabilization.

CR-5000

Connect scope to pin 1 of CPU (TP-1). Set scope time base to 5ms/div.
With TEMPO set at 200 adjust VR1 for 12.5ms/cycle (50ms/4 cycles).
Reset TEMPO to 50 and confirm that 1 cycle is $50m\pm1ms$. If exceeds this limit,
readjust VR1 for 1ms at the sacrifice of $\pm2ms$ error at TEMPO 200.

CR-8000

Turning TEMPO across its travel, confirm TEMPO DISPLAY; factory set ranges
from 33 ± 2 to $375\pm5\%$. Adjust VR1 as required.

$$\text{NOTE: TEMPO} = \frac{2\ 5\ 0\ 0}{\text{period of one tempo clock cycle (ms)}}$$
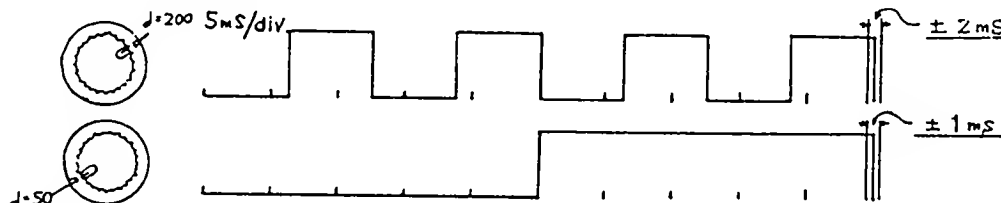
VOICE BOARD

NOISE

Connect scope (1V/div, time base relatively slow) to TP-3.
Adjust VR11 for 2V p-p when measured at rather dense peaks.

CB

Connect scope to TP-1. Adjust VR12 for 1.25ms/cycle.
Connect scope to TP-2. Adjust VR13 for 1.8ms/cycle.

CY

See table right.   Probing CP1-CP6 of oscillators IC6, confirm
frequency ratios between adjacent two; they should be in 1.1-1.4 steps.
Note that two oscillators generating on too close frequency will sound
beating cymbal which can be eliminated by tailoring R and C listing on the
table.

OFFSET

Controls set up - All VOICE LEVELs: FCCW; VOLUME, ACCENT: MAX; RYTHM: DISCO
Start the ryhthm. Monitoring through OUTPUT jack (scope or amp), adjust VR4
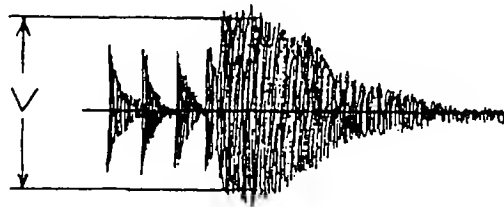for minimum thump.

HCP (CR-8000 only)

Controls set up - HCP VOICE LEVEL: FCW;   VOLUME: MAX;   ARRANGER: HAND CLAP

Connect scope V IN to OUTPUT jack and H (EXT) to HCP trig terminal 23.

Adjust VR10 for the below:

  Serial number up to 101299   1V p-p
  Serial number 101300 and up 2V p-p

		CHECK POINT	FREQUENCY (mS)(Hz) MIN	TYP	MAX	AMPLITUDE (Vp-p) MIN	TYP	MAX	DECAY TIME (mS) MIN	TYP	MAX	VOICE LEVEL CONTROL AT HOT TERMINAL — AMPLITUDE (Vp-p) MIN	TYP	MAX	DECAY TIME (mS) MIN	TYP	MAX	OUTPUT JACK AMPLITUDE (Vp-p)
BD	H	IC2 PIN1	13.2 (76)	11.4 (88)	9.7 (103)	6.8	7.6	8.4	30	40	50	6.7	8.0	9.6	77	96	115	1.2
BD	L	IC2 PIN7	20.2 (50)	17.5 (57)	15.0 (67)	11.9	13.2	14.5	90	100	110							
SD	H	IC6 PIN1	3.5 (286)	3.0 (333)	2.5 (400)	4.7	5.6	6.5	8	10	12	10.8	13.0	15.6	58	72	86	1.7
SD	L	IC6 PIN7	5.1 (196)	4.4 (227)	3.8 (266)	16.8	20.0	23.2	28	34	40							
LT		IC3 PIN7	10.9 (91.7)	9.4 (106)	8.0 (124)	24	27	28				7.0	8.8	10.6	160	200	240	1.3
HT		IC3 PIN1	7.6 (132)	6.6 (152)	5.6 (177)	24	27	28				4.6	6.0	7.4	120	150	180	1.0
LC		IC9 PIN7	5.8 (172)	5.0 (200)	4.3 (234)	24	27	28				6.4	8.0	9.6	136	170	200	1.3
MC		IC9 PIN1	3.9 (256)	3.4 (294)	2.9 (343)	24	27	28				2.2	2.8	3.4	80	100	120	0.4
HC		IC8 PIN1	1.67 (599)	1.45 (670)	1.24 (807)	24	27	28				3.4	4.3	5.1	12	15	18	0.6
CB		TP1,VR12 TP2,VR13		1.25 (800) 1.80 (555)								1.1	1.3	1.6	29	36	43	1.3
C		Q9 COLLECTOR	0.49 (2.01K)	0.43 (2.33K)	0.37 (2.72K)							1.3	1.6	1.9	11	14	17	1.5
HCP		VR10										0.4	0.6	0.8	72	90	108	2.0
RS												18.4	23	27.6	24	30	36	2.6
CY												6.3	7.6	9.1	300	380	450	1.2
HH												5.8	7.0	8.4	59	74	89	1.1
OHH												5.8	7.0	8.4	240	300	360	1.1

	CHECK POINT	R (KΩ)	C (µF)	FREQUENCY (mS)(Hz) MIN	TYP	MAX
	CP1	R233 390	C131 0.01	1.58 (631)	1.26 (794)	
RS	CP2	R221 470	C130 0.01		1.54 (647)	
CY	CP3	R219 390	C129 0.015		1.91 (524)	
HH	CP4	R232 390	C135 0.018		2.25 (444)	
OHH	CP5	R231 470	C134 0.018		2.72 (368)	
	CP6	R226 680	C133 0.015	4.20 (238)	3.53 (283)	

CR-5000 S/N with 101400 -

CR-8000 S/N with 101300 -

Ref. set up

VOICE LEVEL, VOLUME: MAX

ACCENT   : MIN
(@ MAX, add 12dB to each:
four times MIN.)

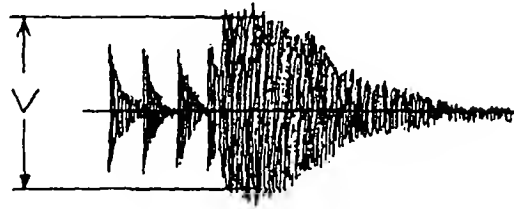			CHECK POINT	FREQUENCY (mS)(Hz) MIN	TYP	MAX	AMPLITUDE (Vp-p) MIN	TYP	MAX	DECAY TIME (mS) MIN	TYP	MAX	VOICE LEVEL CONTROL AT HOT TERMINAL — AMPLITUDE (Vp-p) MIN	TYP	MAX	DECAY TIME (mS) MIN	TYP	MAX	OUTPUT JACK AMPLITUDE (Vp-p)
BD	H	IC2 PIN1	13.2 (76)	11.4 (88)	9.7 (103)	6.8	7.6	8.4	30	40	50	7.2	9.0	10.8	77	96	115	
BD	L	IC2 PIN7	20.2 (50)	17.5 (57)	15.0 (67)	11.9	13.2	14.5	90	100	110							1.5
SD	H	IC6 PIN1	4.4 (227)	3.8 (263)	3.2 (308)	24	27	28	54	64	74	9.6	12.0	14.4	58	72	86	1.7
SD	L	IC6 PIN7	5.1 (196)	4.4 (227)	3.8 (266)				30	40	50							
LT		IC3 PIN7	10.9 (91.7)	9.4 (106)	8.0 (124)							7.2	9.0	10.8	160	200	240	1.5
HT		IC3 PIN1	7.6 (132)	6.6 (152)	5.6 (177)							5.6	7.0	8.4	120	150	180	1.0
LC		IC9 PIN7	5.8 (172)	5.0 (200)	4.3 (234)							6.4	8.0	9.6	136	170	200	1.3
MC		IC9 PIN1	3.9 (256)	3.4 (294)	2.9 (343)							2.4	3.0	3.6	80	100	120	0.5
HC		IC8 PIN1	1.67 (599)	1.45 (690)	1.24 (807)							3.4	4.3	5.1	12	15	18	0.6
CB		TP1,VR12 TP2,VR13		1.25 (800) 1.80 (555)								1.1	1.3	1.6	29	36	43	1.3
C		Q9 COLLECTOR	0.49 (2.01K)	0.43 (2.33K)	0.37 (2.72K)							1.3	1.6	1.9	11	14	17	1.5
HCP		VR10										0.4	0.6	0.8	72	90	108	1.0
RS												10	13	16	24	30	36	1.5

CR-5000 S/N up to 101399

Controls set up – HCP VOICE LEVEL: FCW;   VOLUME: MAX;   ARRANGER: HAND CLAP
Connect scope V IN to OUTPUT jack and H (EXT) to HCP trig terminal 23.
Adjust VR10 for the below:

Serial number up to 101299   1V p-p
Serial number 101300 and up 2V p-p

	CHECK POINT	FREQUENCY (mS)(Hz) MIN	TYP	MAX	AMPLITUDE (Vp-p) MIN	TYP	MAX	DECAY TIME (mS) MIN	TYP	MAX	VOICE LEVEL CONTROL AT HOT TERMINAL — AMPLITUDE (Vp-p) MIN	TYP	MAX	DECAY TIME (mS) MIN	TYP	MAX	OUTPUT JACK AMPLITUDE (Vp-p)
BD H	IC2 PIN1	13.2 (76)	11.4 (88)	9.7 (103)	6.8	7.6	8.4	30	40	50	6.7	8.0	9.6	77	96	115	1.2
BD L	IC2 PIN7	20.2 (50)	17.5 (57)	15.0 (67)	11.9	13.2	14.5	90	100	110							1.2
SD H	IC6 PIN1	3.5 (286)	3.0 (333)	2.5 (400)	4.7	5.6	6.5	8	10	12	10.8	13.0	15.6	58	72	86	1.7
SD L	IC6 PIN7	5.1 (196)	4.4 (227)	3.8 (266)	16.8	20.0	23.2	28	34	40							1.7
LT	IC3 PIN7	10.9 (91.7)	9.4 (106)	8.0 (124)	24	27	28				7.0	8.8	10.6	160	200	240	1.3
HT	IC3 PIN1	7.6 (132)	6.6 (152)	5.6 (177)	24	27	28				4.6	6.0	7.4	120	150	180	1.0
LC	IC9 PIN7	5.8 (172)	5.0 (200)	4.3 (234)	24	27	28				6.4	8.0	9.6	136	170	200	1.3
MC	IC9 PIN1	3.9 (256)	3.4 (294)	2.9 (343)	24	27	28				2.2	2.8	3.4	80	100	120	0.4
HC	IC8 PIN1	1.67 (599)	1.45 (690)	1.24 (807)	24	27	28				3.4	4.3	5.1	12	15	18	0.6
CB	TP1,VR12 TP2,VR13		1.25 (800) 1.80 (555)								1.1	1.3	1.6	29	36	43	1.3
C	Q9 COLLECTOR	0.49 (2.01K)	0.43 (2.33K)	0.37 (2.72K)							1.3	1.6	1.9	11	14	17	1.5
HCP	VR10										0.4	0.6	0.8	72	90	108	2.0
RS											18.4	23	27.6	24	30	36	2.6
CY											6.3	7.6	9.1	300	380	450	1.2
HH											5.8	7.0	8.4	59	74	89	1.1
OHH											5.2	7.0	8.4	240	300	360	1.1

	CHECK POINT	R (KΩ)	C (μF)	FREQUENCY (mS)(Hz) MIN	TYP	MAX
RS	CP1	R223 390	C131 0.01	1.58 (631)	1.26 (794)	
CY	CP2	R221 470	C130 0.01		1.56 (647)	
	CP3	R??? 390	C129 0.015		1.91 (524)	
HH	CP4	R232 390	C135 0.018		2.25 (444)	
OHH	CP5	R231 470	C134 0.018		2.72 (368)	
	CP6	R226 680	C133 0.015	4.20 (238)	3.53 (283)	

CR-5000 S/N with 101400 –
CR-8000 S/N with 101300 –

Ref. set up
VOICE LEVEL, VOLUME: MAX
ACCENT   : MIN
(@ MAX, add 12dB to each:
four times MIN.)

	CHECK POINT	FREQUENCY (mS)(Hz) MIN	TYP	MAX	AMPLITUDE (Vp-p) MIN	TYP	MAX	DECAY TIME (mS) MIN	TYP	MAX	VOICE LEVEL CONTROL AT HOT TERMINAL — AMPLITUDE (Vp-p) MIN	TYP	MAX	DECAY TIME (mS) MIN	TYP	MAX	OUTPUT JACK AMPLITUDE (Vp-p)
BD H	IC2 PIN1	13.2 (76)	11.4 (88)	9.7 (103)	6.8	7.6	8.4	30	40	50	7.2	9.0	10.8	77	96	115	1.5
BD L	IC2 PIN7	20.2 (50)	17.5 (57)	15.0 (67)	11.9	13.2	14.5	90	100	110							1.5
SD H	IC6 PIN1	4.4 (227)	3.8 (263)	3.2 (308)	24	27	28	54	64	74	9.6	12.0	14.4	58	72	86	1.7
SD L	IC6 PIN7	5.1 (196)	4.4 (227)	3.8 (266)				30	40	50							1.7
LT	IC3 PIN7	10.9 (91.7)	9.4 (106)	8.0 (124)							7.2	9.0	10.8	160	200	240	1.5
HT	IC3 PIN1	7.6 (132)	6.6 (152)	5.6 (177)							5.6	7.0	8.4	120	150	180	1.0
LC	IC9 PIN7	5.8 (172)	5.0 (200)	4.3 (234)							6.4	8.0	9.6	136	170	200	1.3
MC	IC9 PIN1	3.9 (256)	3.4 (294)	2.9 (343)							2.4	3.0	3.6	80	100	120	0.5
HC	IC8 PIN1	1.67 (599)	1.45 (690)	1.24 (807)							3.4	4.3	5.1	12	15	18	0.6
CB	TP1,VR12 TP2,VR13		1.25 (800) 1.80 (555)								1.1	1.3	1.6	29	36	43	1.3
C	Q9 COLLECTOR	0.49 (2.01K)	0.43 (2.33K)	0.37 (2.72K)							1.3	1.6	1.9	11	14	17	1.5
HCP	VR10										0.4	0.6	0.8	72	90	108	1.0
RS											10	13	16	24	30	36	1.5
CY											2.5	3.5	4.5	300	380	450	1.0
HH											3.0	4.0	5.0	59	74	89	1.0
OHH											3.0	4.0	5.0	240	300	360	1.0

CR-5000 S/N up to 101399
CR-8000 S/N up to 101299

See table above for
RS, CY, HH and OHH frequencies.

EC.8,1981

2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

CPU BOARD

ANTI LOG Q12,13

VCO IC16,Q11

CPU CLOCK (6MHz)

POWER SUPPLY → +5 → +15 → -15

XTAL

0

DB

DATA BUS

7

INTRO FILL IN

BUFFER Q4

DIVIDER IC15

ONE SHOT C42,R59 IC16

T₀

T₁

ALE

ADDRESS LATCH IC8

LATCH IC1

LATCH IC2

START STOP

BUFFER Q5

T.FF IC15

CPU IC10

RESTART

BUFFER Q6

ONE SHOT C47,R59 IC16

4mS

INT

DECODER IC6

REGISTER

BUFFER Q3

RD WR P27

OUTPUT

BUFFER IC7 IC11 IC12

PORT

TRIG OUT OUTPUT

RESET

RESET

ONE SHOT R46,C48 IC16

BUFFER Q7

TRIG OUT SELECTOR

HH

ENVELOPE Q14

BD OSC1 IC2

BD LEVEL

CY OSC IC12

OHH

ENVELOPE Q13,Q15

BD

BD OSC2 IC2

MIX IC1

HC

HC OSC IC8

BPF IC13

GATE Q16

HPF Q7

MC

MC OS IC9

GATE Q19

BUFFER Q23

HPF

MIX IC14

CY,HH,OHH LEVEL

CY

CY ENVELOPE Q21

LC

LC OS IC9

CONTROLLER Q37

GATE Q20

BUFFER Q18

BPF IC13

HPF Q22

ACC

ACC Q41 Q25

RS

ENVELOPE Q38

GATE Q36

BUFFER Q34

HPF Q35

MIX IC1

VCA IC7

SD TOM RS LEVEL

Q11

AMP IC10

TRIG PULSE

LPF Q12

SD OSC1 IC6

HT

HT OSC IC3

SD

SD OSC2 IC6

NOISE ENVELOPE Q1

GATE Q2

BPF

CPU BOARD

POWER SUPPLY → +5 +15 −15

CPU BOARD

- ANTI LOG Q12,13
- VCO IC16,Q10
- CPU CLOCK (6MHz)
- DIVIDER IC15
- ONE SHOT C42,R51 IC16
- T.FF IC15
- BUFFER Q4
- BUFFER Q5
- BUFFER Q6
- BUFFER Q3
- ONE SHOT C47,R57 IC16 — 4mS
- BUFFER IC7 IC11 IC12
- CPU IC10
- RESET
- ADDRESS LATCH IC8
- LATCH IC1
- LATCH IC2
- DECODER IC6
- ONE SHOT R46,C48 IC16
- BUFFER Q7
- TRIG OUT SELECTOR

DATA BUS

DB, XTAL, To, T1, INT, PORT, RD, WR, P27, ALE, RESET

INTRO-FILL IN, START STOP, REGISTER RESTART, OUT PUT, TRIG OUT OUT PUT

Lower section

- HH → ENVELOPE Q14
- OHH → ENVELOPE Q13,Q15
- CY OSC IC12
- BPF IC13
- GATE Q16
- HPF Q7
- BD OSC1 IC2
- BD OSC2 IC2
- MIX IC1
- BD LEVEL
- HC → HC OSC IC8
- MC → MC IC
- LC → LC C IC
- GATE Q19
- BUFFER Q23
- HPF
- MIX IC14
- CY.HH.OHH LEVEL
- CY → CY ENVELOPE Q21
- GATE Q20
- BUFFER Q18
- BPF IC13
- HPF Q22
- CONTROLLER Q37
- ACC → ACC Q41 Q25
- RS → ENVELOPE Q38
- GATE Q36
- BUFFER Q34
- HPF Q35
- MIX IC1
- SD TOM RS LEVEL
- VCA IC7
- Q11 → AMP IC10
- TRIG PULSE
- LPF Q12
- SD OSC1 IC6
- SD OSC2 IC6
- NOISE ENVELOPE Q6
- GATE Q7
- HPF
- HT → HT OSC IC3
- NOISE ENVELOPE Q1
- GATE Q2
- BPF
- LT → LT OSC IC3

CONTROL BOARD

CR-5000
BLOCK DIAGRAM

GL3124-060 CPU BOARD

240v

SOME MODIFICATIONS
FOR PCB 2291046400
AT FOIL SIDE
SEE CR-8000 LAYOUT

	F 1	F 2	F 3
100 V	jumper	jumper	jumper
117 V	jumper	jumper	jumper
220V, 240V	CEE T1A	CEE T400mA	CEE T400mA
240V 3P	CEE T1A	CEE T400mA	CEE T400mA

BLU—

BRN—

YEL/GRN—

IC 1,2,8 : DM74LS273   IC9 : HD74LS04P   Q1,7,8,11 : 2SA733(P)
IC4 K4 : HD14023BP   D3~5 : DS442 or 1S2473/1S1598   Q2~6,12,13 : 2SC945(P)
IC5 IC6 : HD7445   IC13 : µA7805UC   Q16 : 2SB596(O)
IC7 IC7,11,12 : HD14050BP   IC14 : TA7179P   Q17 : 2SD880(Y)
IC15 IC0 : HD14013BP   IC16 : HD14584BP
HO

18 19 20 21 22 23 24 25 26 27 28 29 30

(TP1) TEMPO ADJ.
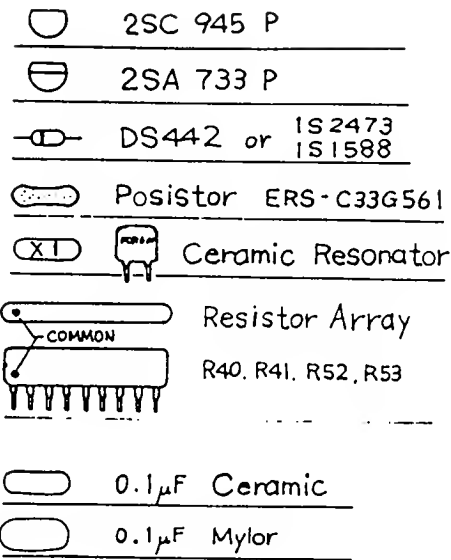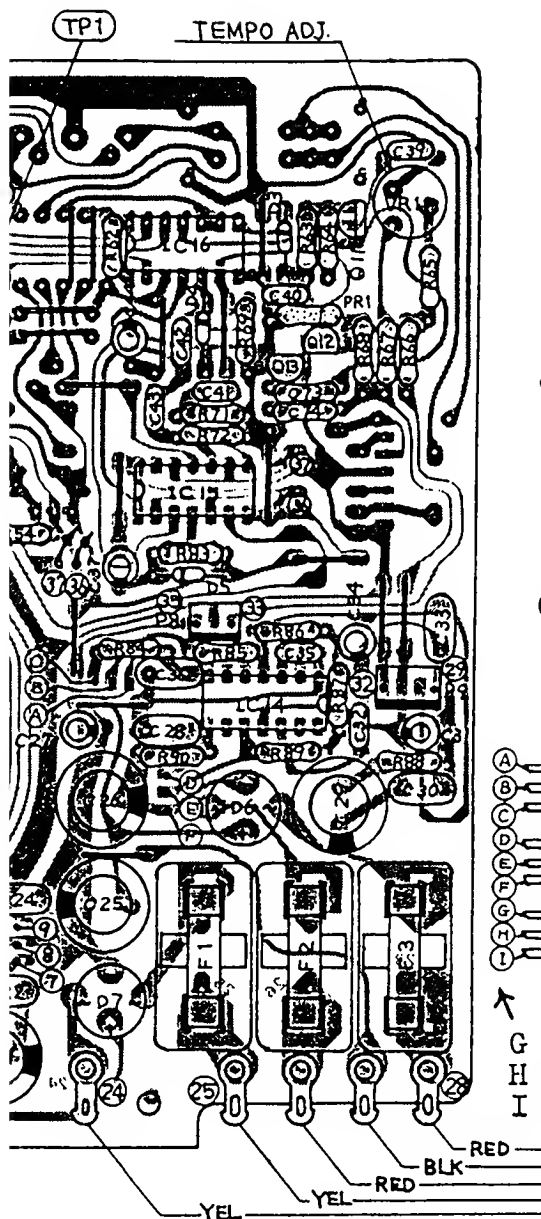
CR-5000
CPU BOARD
GL-3124-060
(7312406008)
(pcb 2291046401)

Legend:
- 2SC 945 P
- 2SA 733 P
- DS442 or 1S2473 / 1S1588
- Posistor ERS-C33G561
- X1 Ceramic Resonator
- Resistor Array — COMMON — R40, R41, R52, R53
- 0.1μF Ceramic
- 0.1μF Mylar

Q16 ○
Q17 ○
IC13 ○

G = 7
H = 8
I = 9

CHANGES IN COMPONENTS

Ensure trigger outputs
at IC1 when low V_{OH}
LS273 is used.

R47	47k to	10k
R48	47k to	D6
R1	10k to	27k
R61	10k to	27k
R60	10k to	27k

Prevents possible
oscillation at
final amp upon
power off

C29: 470uF to 100uF
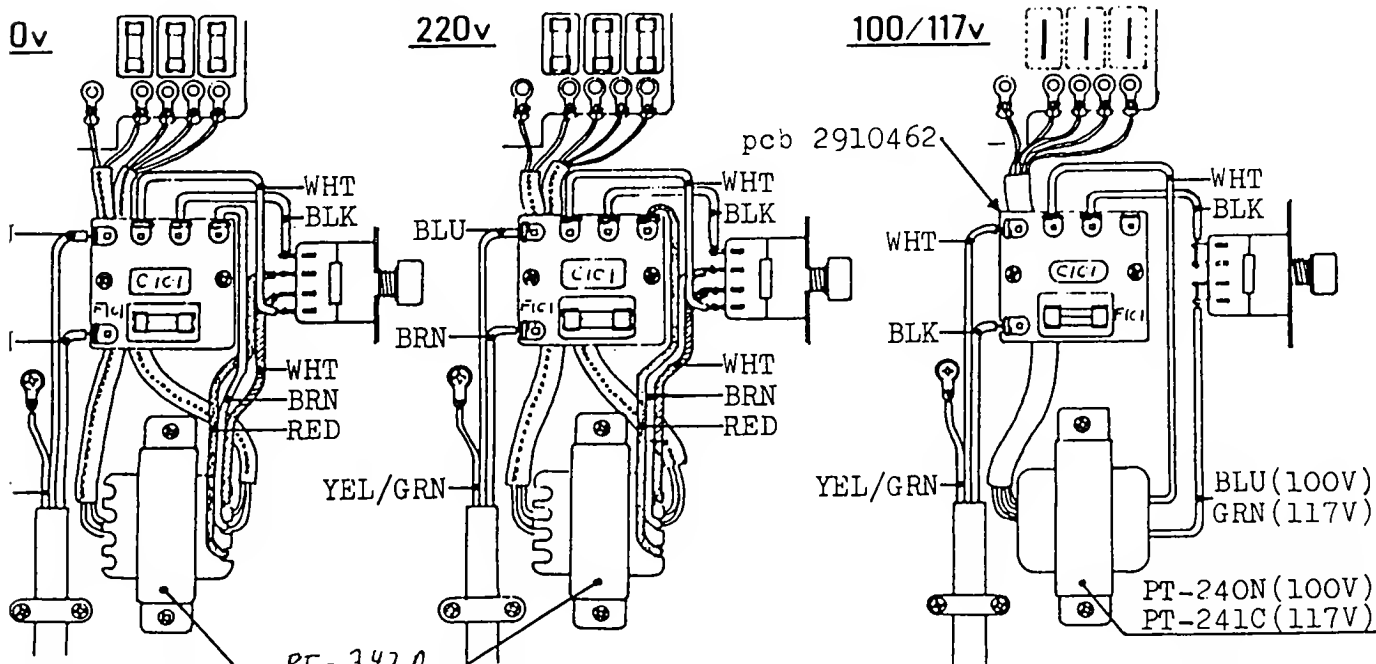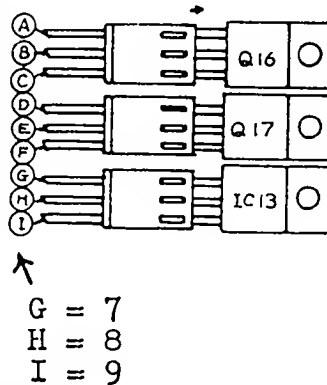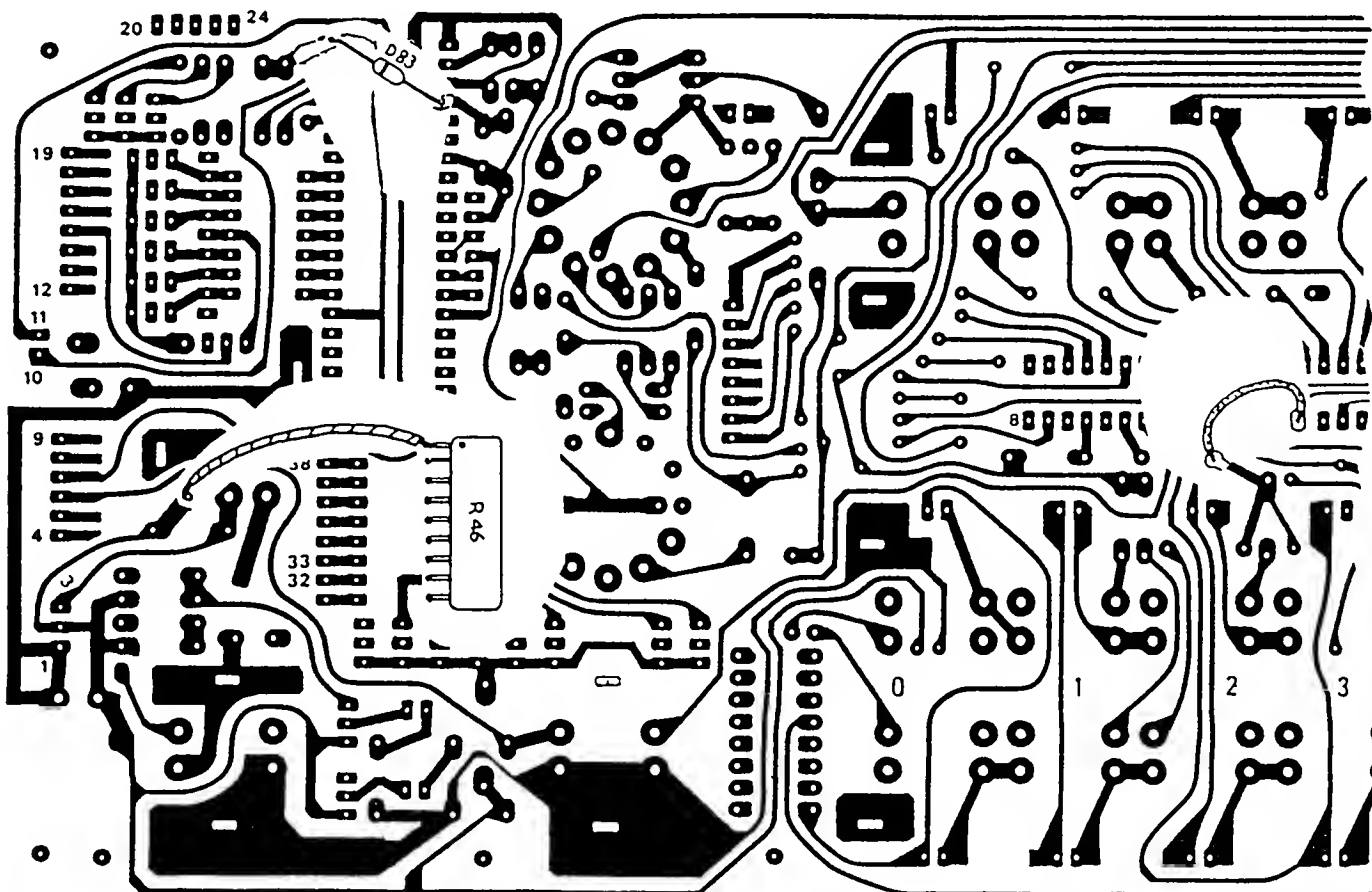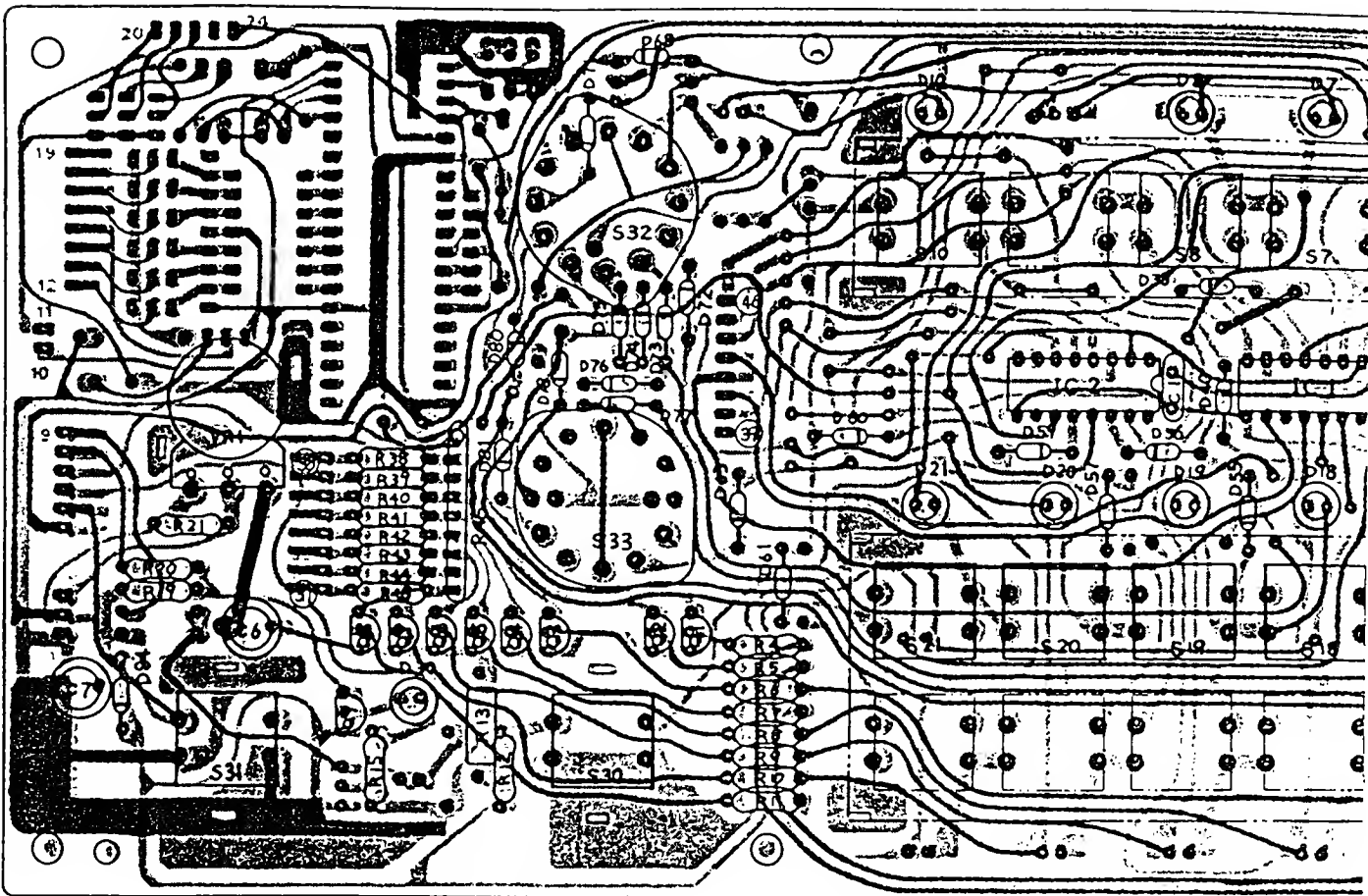
RED
BLK
RED
YEL
YEL
YEL

0v

WHT
BLK
CIC1
FIC1
WHT
BRN
RED

220v

BLU
WHT
BLK
CIC1
FIC1
BRN
WHT
BRN
RED
YEL/GRN

PT-2470

100/117v

pcb 2910462
WHT
WHT
BLK
CIC1
FIC1
BLK
YEL/GRN
BLU(100V)
GRN(117V)
PT-240N(100V)
PT-241C(117V)

19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
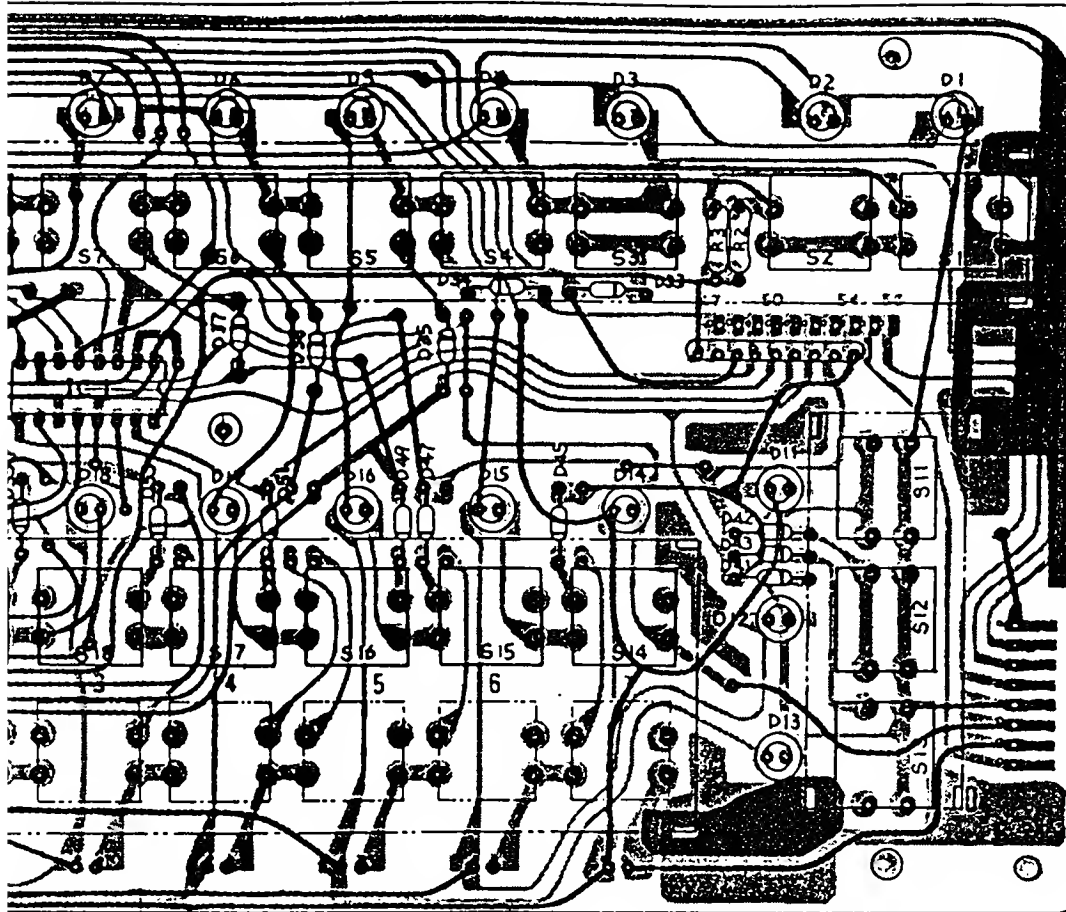
CR-5000

CONTROL BOARD
GL3124-090
(7312409010)
(pcb 2291046501)

with serial number 152650
(Viewed from the rear)
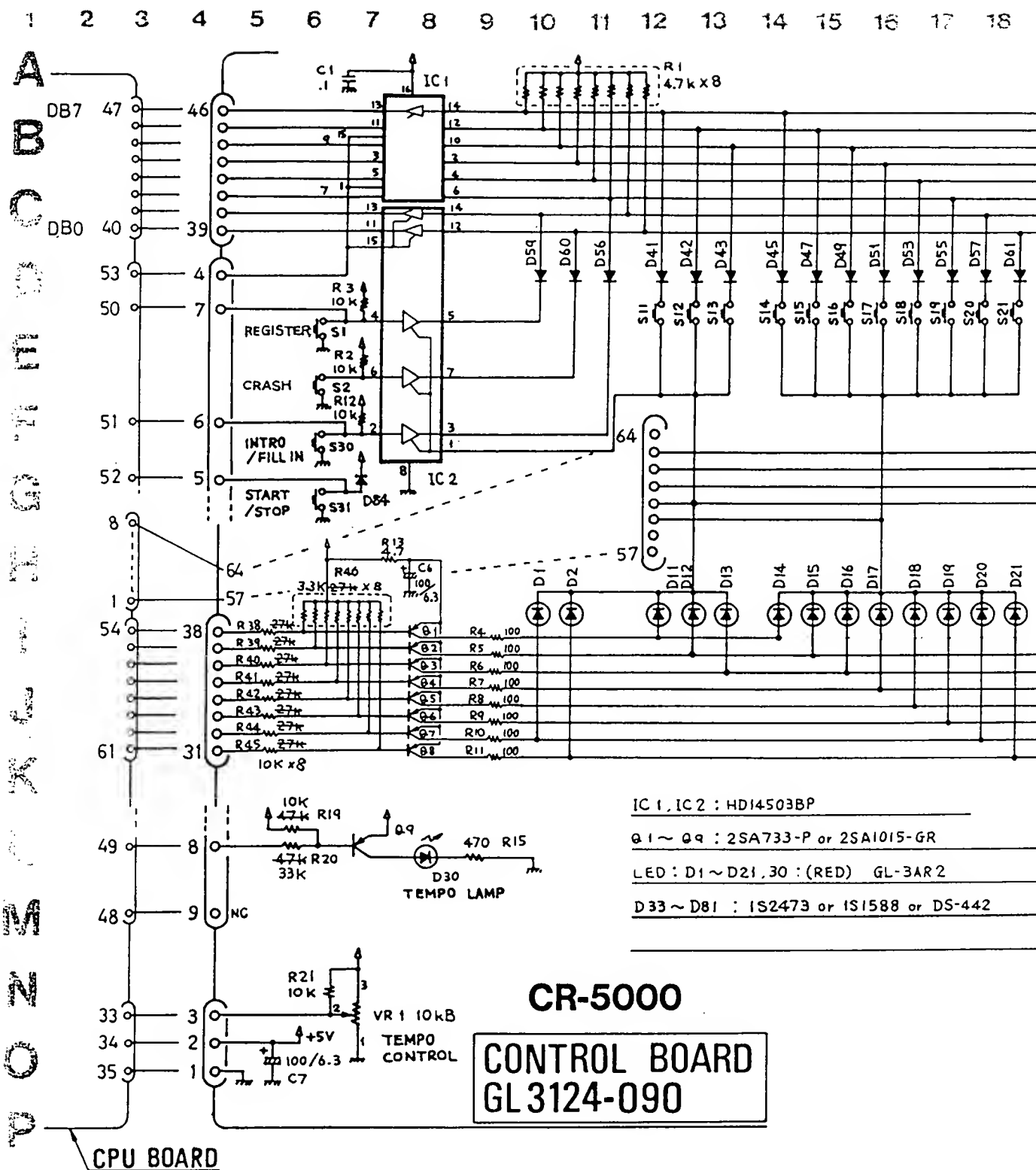
—◁▢— : DS442 or 1S1588, 1S2473

▢ : 2SA733 P or 2SA1015 GR

◉ : LED GL-3PR2 (RED)

## (pcb 2291046500)

surface mounting
D83 - CR-8000 only

IC 1, IC 2 : HD14503BP

Q1 ~ Q9 : 2SA733-P or 2SA1015-GR

LED : D1 ~ D21, 30 : (RED) GL-3AR2

D33 ~ D81 : 1S2473 or 1S1588 or DS-442

CR-5000

**CONTROL BOARD
GL3124-090**

CPU BOARD

CHANGES IN RESISTANCE With Serial Number 091100 and up

The changes eliminates possible dim lighting of LEDs due to insuffic
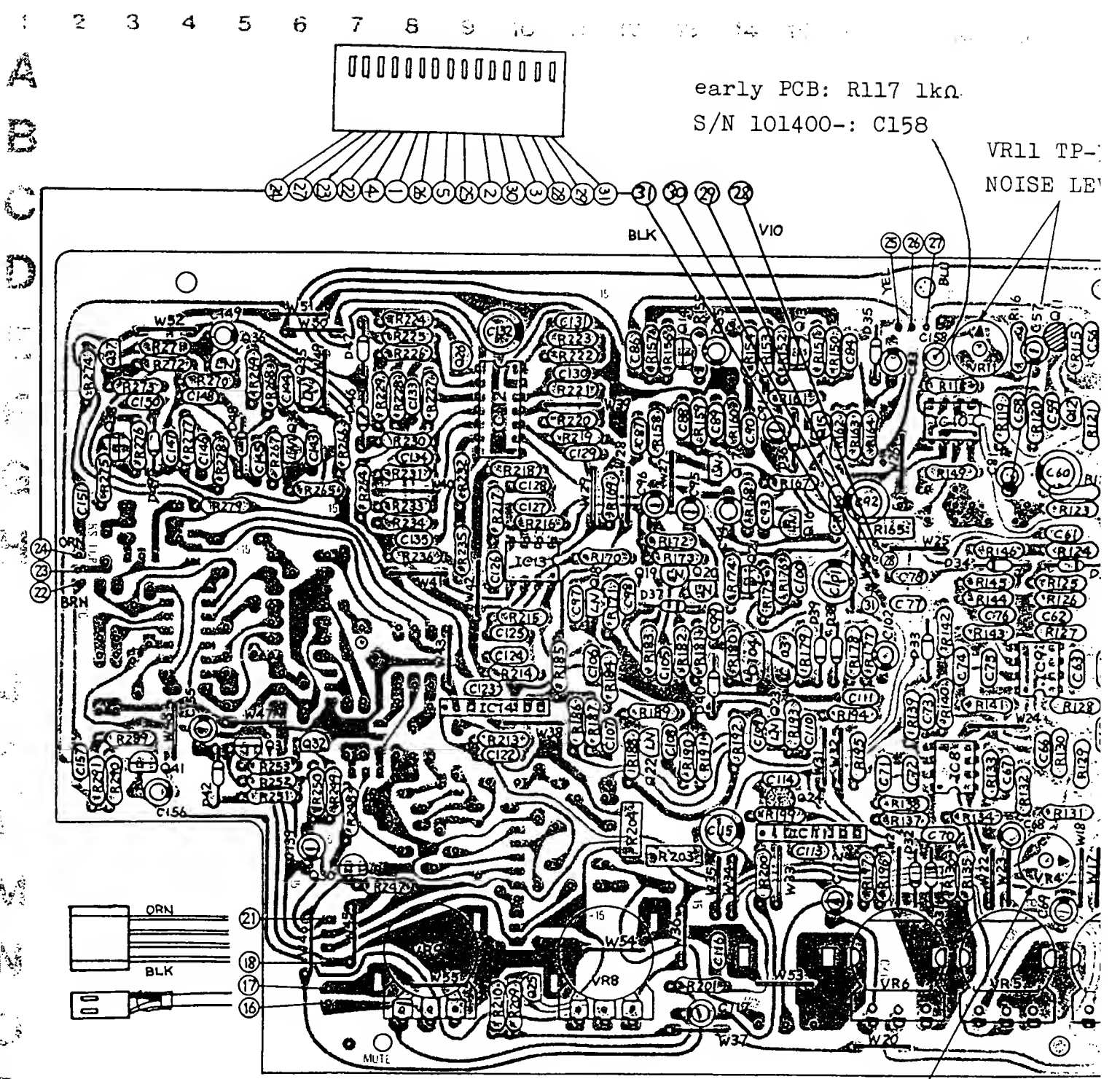at IC1 or IC2 on CPU board:

R38-R45: 27k to 10k   R19: 47k to 10k   R20: 47k to 33k
Resistor Array R46: 27k to 3.3k

18 19 20 21 22 23 24 25 26 27 28 29 30
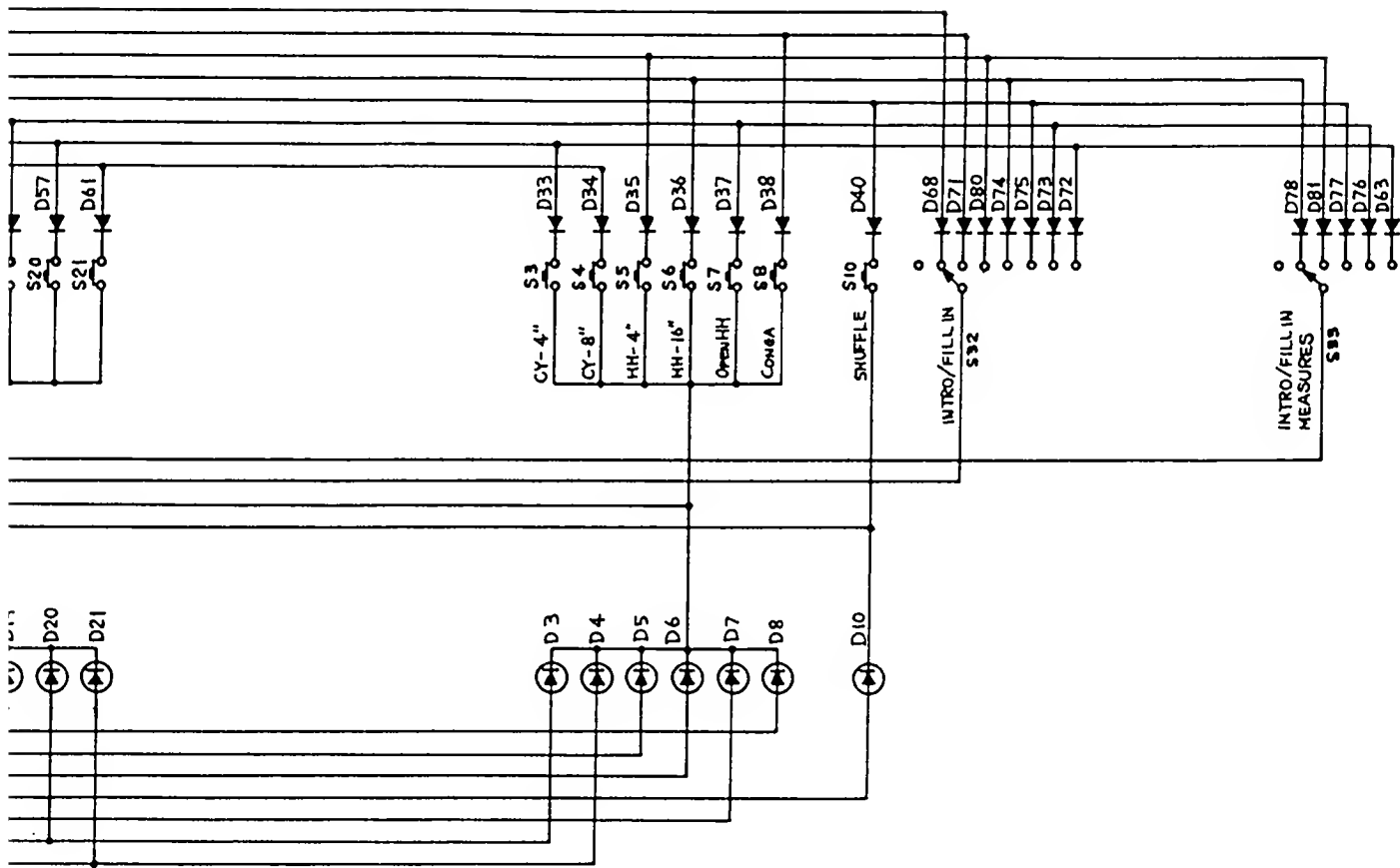
sufficient H level output

early PCB: R117 1kΩ

S/N 101400-: C158

VR11 TP-
NOISE LE'

VR4 OFFSET

BLK

V10

YEL   BLU

VR9

with S/N 091100

From 10k to 50k

VR9   VR8   VR6   VR5   V

2SC945-P

2SC732TM-GR

2SA733-P

2SC945-P(NZ)

2SK30A-Y

DS442, 1S2473 or 1S1588

1S188FM

CR-5000

VOICING BOARD

HA1457

5 21 22 23 24 25 26 27 26 29 30 ... 36 ... 38 39 ..
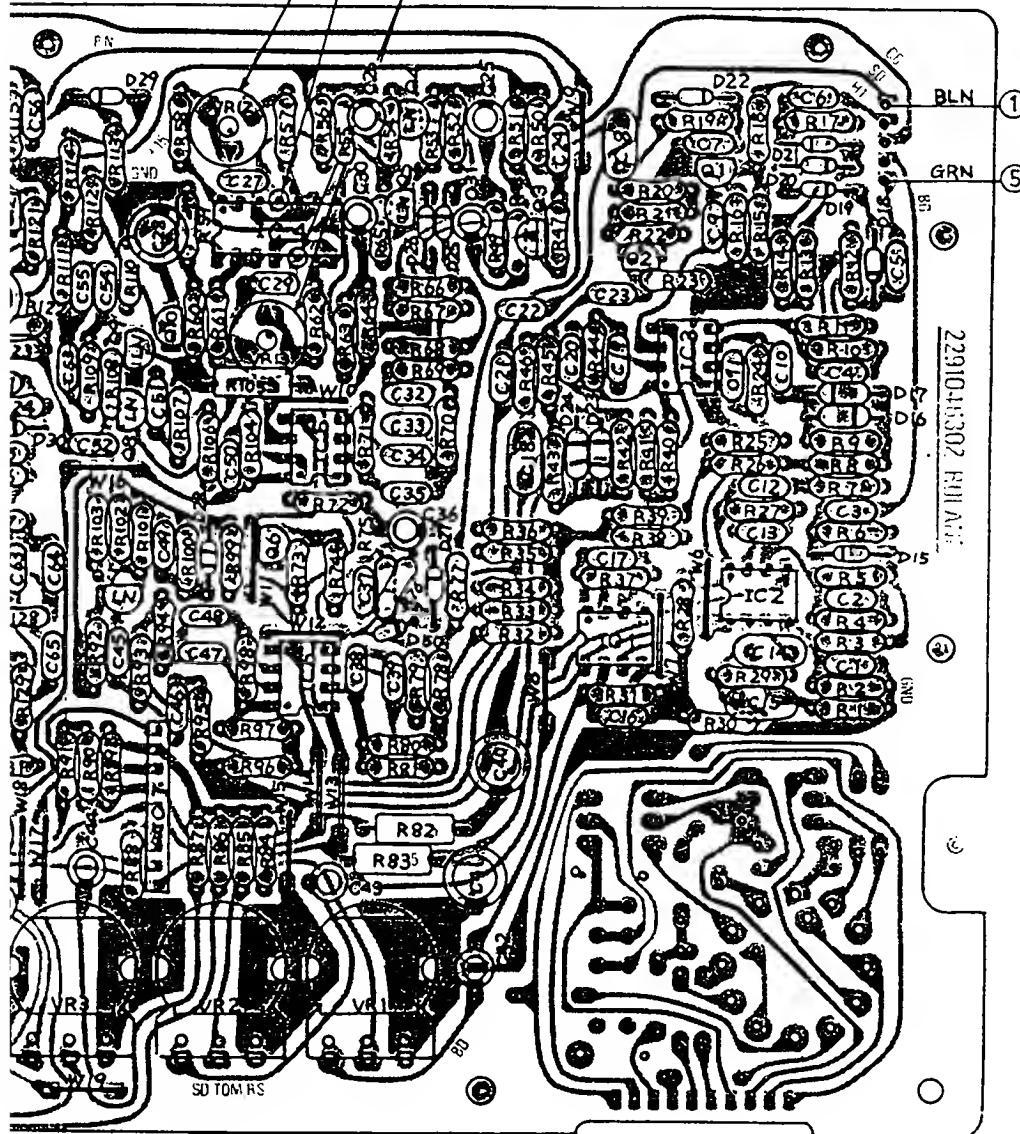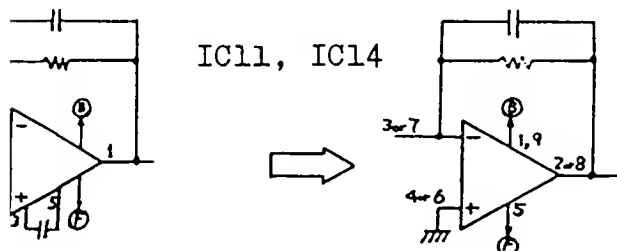
VR12 TP-1
CB FREQ

P-3
LEVEL

VR13 TP-2
CB FREQ

WITH S/N 111700
R55,56,58,61,63,64

Resistances are increased
to limit currents into
IC4. This modification is
mandatory when replacing
defective IC4.

CHANGES IN COMPONENT WITH SERIAL NUMBERS:

CR-5000 101400
CR-8000 101300

VR3   VR2   VR1

IC11, IC14

57W(8-pin) or NJM4558S (9-pin)
See p. 22 for detail.

• SD			
R94	330	→	2.2k
R97	33k	→	10k
R79	1k	→	15k
R80	33k	→	10k
R76	22k	→	47k
R99	4.7k	→	10k
R33	33k	→	15k
R32	33k	→	47k
R34	33k	→	22k
R100	2.2M	→	1M
C48, 47	.033µF	→	.015µF
C39, C38	.027µF	→	.0047µF
C49	.015µF	→	.018µF
C45	.0047µF	→	.0022µF
C46	.001µF	→	.015µF
• NOISE			
VR11	5k(B)	→	10k(B)
R117	1k	→	open
C158	0	→	10µF/16
• TOM TOM			
R46	6.8k	→	22k
R38	82k	→	33k
R39	68k	→	27k
R37	220k	→	82k
C18	.068µF	→	.018µF
C7	.01µF	→	.018µF
• CONGA			
R133	120k	→	100k
• CB			
R59	3.3k	→	3.9k
R56	18k	→	22k
R63	18k	→	22k
• OUTPUT			
C114	100pF	→	47pF
• ACC			
C156	0.47µF	→	1µF

• CY, HH, OHH			
R217	10k	→	27k
R170	10k	→	22k
R187	82k	→	56k
R186	270k	→	220k
R213	47k	→	150k
R86	100k	→	180k
C90	.0047µF	→	.001µF
C122	100pF	→	47pF
• RS			
R271	1M	→	2.2M
R278	220k	→	56k
R36	220k	→	47k
C147	.002µF	→	.01µF

• BD
R 31   33k

CB

R55,56,58,61,63,64
Resistances are increased to limit
currents into IC4.
This modification is mandatory
when replacing
defective IC4.

MC

ACC

CONGA LEVEL

ACCENT

VOLUME

IC11

CR-5000
VOICE GENERATOR BOARD
VG 3124-110

CPU BOARD

NOISE GENERATOR

LEFT

When ½IC10 bias current is
high, it heavily DC biases
output waveform, narrowing
headroom. (Flatened one
peak at relarively small
input signal.)

RIGHT

Decoupling capacitor makes
DC gain of the IC unity.

Q11: 2SC945P(NB)

Noise Level
2 V_{P-P}

IC 1,2,3,5,6,8,9,10,13 : NJM4558DP
IC 11,14 : HA1457W or NJM4558S
Q 1,6,10,12,15,25,26,32,37 : 2SC945P
Q 24,5,7,8,9,16~20,22,23,34~36 : 2SC732TM GR
Q 3,13,14,21,30,31,38,41 : 2SA733P

IC7: BA662(B)

PARTS LIST

* CR-8000   ** CR-5000

2201061100	Case N-611
*2281028102	Chassis(bottom plate) N-281
*22020159	Battery cover
*12199525	Battery holder
*2219024802	Holder
*2226031000	Cushion
**2281027302	Chassis(bottom plate) N-273
2235010100	Rubber foot
2281027201	Chassis N-272 power trans.
*2221027100	Panel(upper) N-271
**2221025900	Panel(upper) N-259
*2221027200	Panel(lower) N-272
**2221026000	Panel(lower) N-260
*2222030200	Escutcheon(LED window)N-302

KNOB. BUTTON

2247012800	Knob N-128 rotary small
2247016500	Knob N-165 rotary large
2247050900	Button N-509 wht p.sw.
2247051600	Button N-516
2247051700	Button N-517
2247051800	Button N-518
2247051900	Button N-519
2247052000	Button N-520
2247052100	Button N-521
2247052200	Button N-522
2247052300	Button N-523

POWER TRANSFORMER

22450240N1	PT-N-240N	100V
22450241C1	PT-N-241C	117V
22450242D0	PT-N-242D	220/240V

POTENTIOMETER

13219229	EVHRRA361B14 TEMPO, VOLUME on early units
13219312	EVHLWAD25B14 Voice level
13219238	EVHRRA361B15 ACCENT
13219245	EVHRRA361B54 VOLUME not on eary products
13299106	EVTR4AA00B53 5kB trim
13299101	EVTR4AA00B14 10kB trim
13299107	EVTR4AA00B54 50kB trim
13299102	EVTR4AA00B15 100kB trim

SWITCH

13129117	SDK1P	power	100V
13129118	SDK1P w/CSA UL		117V
13129110	ESB-70294		220/240V
13159316	HSW-0372-01-030 slide TRIG OUT select. SYNC IN/OUT		
13129714	KEH10903	RHYTHM SELECT	
13119508	SRM1026K15	FILL IN MEASURE	
*13119806	SRM101CY15	FILIN SELT.INSTMNT	
*13159304	SSB02335	PROGRAM MODE	
**13119704	SRM1018K15	FILL IN SELECT	

PCB

*7312506009	CPU (pcb 2291046401)
**7312406008	CPU (pcb 2291046401)
*7312509008	CONTROL (pcb 2291046500)
**7312409010	CONTROL (pcb 2291046500)
*7312512007	VOICING (pcb 2291046302)
**7312411009	VOICING (pcb 2291046302)
*7312511001	LED (pcb 2291046600)
2291046200	FUSE

JACK. SOCKET

13449106	SG7622#8
*13429607	DIN socket TCS0707-01-010

FUSE

12559104	SGA 0.500	100/117V
12559505	CEE T125mA(s)	220/240V
12559510	T400mA CEE(s) ±15V	220/240V
12559513	CEE T1A(s) +5V	220/240V
12199519	Fuse clip TF-758	

RESISTOR ARRAY

13910107	RM8-332K	3.3K x 8
13910101	RM8-472K	4.7K x 8
13910102	RM8-273K	27K x 8

SEMICONDUCTORS

IC

1517911700	μPD8049C-159	CPU
or		(See Page 5 for difference.)
1517913000	μPD8049C-323	
*15179118	μPD8048C-305	CPU display
15159105HO	HD14013BP	
15159126HO	HD14023BP	
15159128HO	HD14050BP	
15159303HO	HD14584BP	
15169304HO	HD74LS04P	
15169325CO	DM74LS273N	octal D FF
15169115HO	HD7445	BCD-TO-DECIMAL DEC
*15179305	μPD444C	RAM
15199110TO	TA7179P	±15V regulator1519
15199106FO	μA7805UC	+5V regulator
15159306HC	HD14503BP	
15159103TO	TC4011UBP	
15189103	NJM4558DP	
*15189113	AN6912	
15189502	HA1457W	(pin incompatible,
or		see p. 22)
15189135	NJM4558S	
15229803	BA662B	VCA

TRANSISTOR

15119105	2SA733P
15129108	2SC945-P
15129108A	2SC945-P(NZ) noise
15129104	2SC732TM-GR
*15119121	2SA937-Q
*15129121	2SC2021-R
15139101	2SK30ATM-Y
15119806	2SB596-O or Y
15129816	2SD880-O or Y

LED

15029109	GL-3AR2 red
*15029112	GL-3PG2 green BEAT
*15029125	TLR312 DISPLAY

Diode

15019107	DS442 or 1S1588 or 1S2473
15019122	1S188FM
15019236	WO2 bridge rectifier
12389708	FCR-6 (6.0MHz) ceramic resonator

*Switch
SRM101CY15(13119806)

*Knob
N-128 (2247012800)

Pots
EVHLWAD25B14
(13219312)

Pot
EVHRRA361B15
(13219238)

Pot
EVHRRA361B54
(13219245)
(B14 on early products)

Computhythm CR-8000 MICRO COMPUTER CONTROLLED RHYTHM MACHINE ☲Roland

Switch
SDK1P, (13129117) 100V
SDK1P(CSA,UL) 117V
(13129118)
ESB-70294 (13129110)
220/240V

Button
N-509 (2247050900)

*Switch SSB02335(13159304)

Panel   * N-271 (2221027100)
          **N-259 (?221025900)

DISASSEMBLY

Remove ten (10) screws indicated below.

Screws 3 x 8mm Bl binding head

*Screw
3 x 8mm

Rubber foot
(2235010100)

* Battery cover
(22020159)

Chassis
*2281028102
**2281027303

Nyron rivet
NRP-345

Case
N-611
(2201061100)

Screws 3 x 6mm pan head (or SEMS)

Jacks
SG7622#8
(13449106)

Switch
(* 2pcs)
HSW-0372-01-030
(13159316)

*Din socket
TCS0707-01-010
(13429607)

Chassis
2281027201

VOICING BOARD

Screws
3 x 12mm Bl binding

CPU BOARD

Screws
3 x 10mm Bl binding

(13129714)

CONTROL BOARD

HD14050B
Hex Buffers

(Top View)

2SA937
2SC2021

E C B

MC14503B
HEX NON-INVERTING 3-STATE BU

TRUTH TABLE		
In_n	Appropriate Disable Input	Out_n
0	0	0
1	0	1
X	1	High Impedance

X = Don't Care

MAXIMUM RATINGS (Voltages referenced to V_{SS}, Pin 8)

Rating	Symbol	Value	Unit
DC Supply Voltage	V_{DD}	−0.5 to +18	Vdc
Input Voltage, All Inputs	V_{in}	−0.5 to V_{DD} + 0.5	Vdc
DC Current Drain per Input Pin	I	10	mAdc
DC Current Drain per Output Pin	I	25	mAdc
Operating Temperature Range — AL Device CL/CP Device	T_A	−55 to +125 −40 to +85	°C
Storage Temperature Range	T_{stg}	−65 to +150	°C

BA662

CONTROL ①
INV INPUT ②
NON INV INPUT ③
BIAS ④
− V_{CC} ⑤
OUTPUT ⑥
BUFFER { INPUT ⑦
OUTPUT ⑧
⑨

(Top View)

μPC4558C

IN
+9V
− +
8
1
− +
IN −9V
4

(Top View)

74LS04
HEX INVERTER

(Top View)

V_{CC}

GND

TA717

DUAL ±15V TRAC

(To

GND
BALANCE
+ COMPEN
+ SENSE
+ VOUT
NC
VCC

1

7

Reg. IN = 5
Reg. OUT= 5
Ripple rej
Output cur
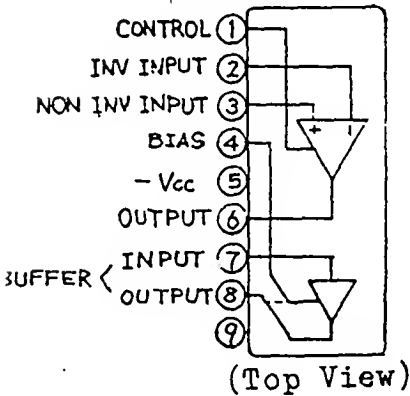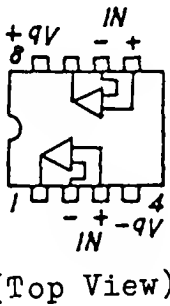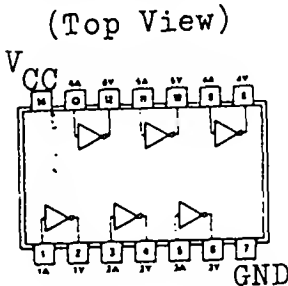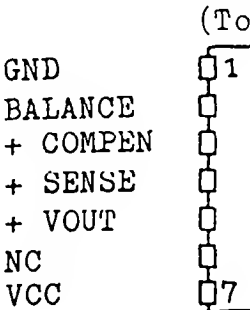
HM4334P-4

μPD444C

4096 BIT STATIC CMOS RAM

A₄ ③
A₅ ②
A₆ ①
A₇ ⑱
A₈ ⑯
A₉ ⑮

ROW SELECT

MEMORY ARRAY
64 ROWS
64 COLUMNS

⑱ V_{CC}
⑨ GND

I/O₁ ⑭
I/O₂ ⑬
I/O₃ ⑫
I/O₄ ⑪

INPUT DATA CONTROL

SENSE SWITCH
COLUMN SELECT

⑤ ⑥ ⑦ ④
A₀ A₁ A₂ A₃

CS ⑧
WE ⑩

(Top View)

A₄ 1
A₅ 2
A₄ 3
A₃ 4
A₀ 5
A₁ 6
A₂ 7
CS 8
GND 9

18 V_{CC}
17 A₇
16 A₈
15 A₉
14 I/O₁
13 I/O₂
12 I/O₃
11 I/O₄
10 WE

= PIN NUMBERS
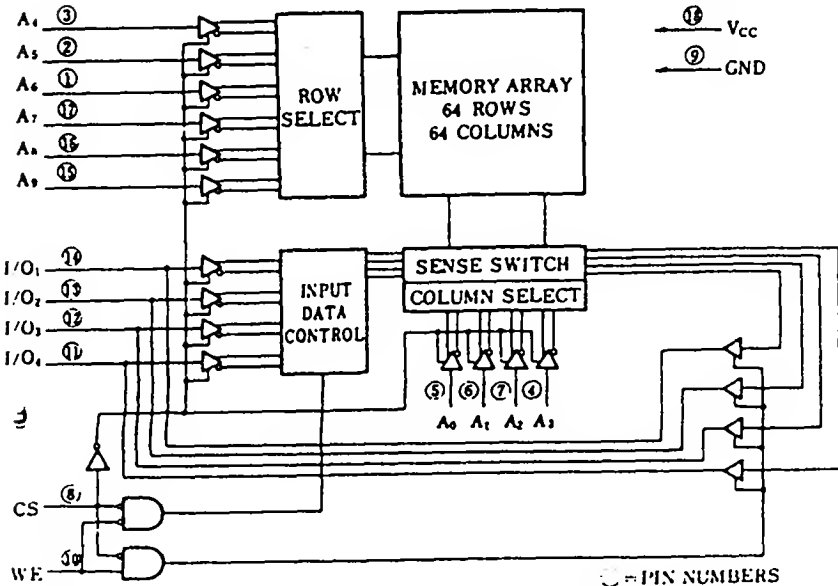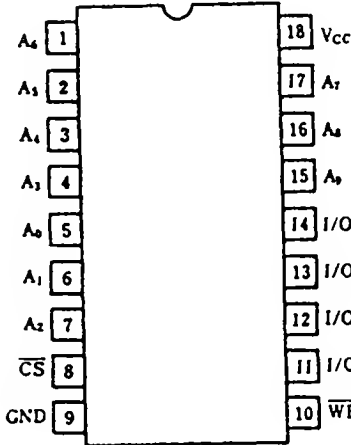
μPC177C
Quad C

Connection

OUT PUT2 1
OUT PUT1 2
V^+ 3
I₁₁ 4
I₁₁ 5
I₁₁ 6
I₁₁ 7

;03B
: 3-STATE BUFFER

LOGIC DIAGRAM

	Out_n
	0
	1
High impedance	

	Unit
	Vdc
0.5	Vdc
	mAdc
	mAdc
	°C
	°C

Disable B 15 — 11 Out 5
In 5 12 — 11 Out 5
In 6 14 — 13 Out 6
In 1 2 — 3 Out 1
In 2 4 — 5 Out 2
In 3 6 — 7 Out 3
In 4 10 — 9 Out 4
Disable A 1

V_{DD} = Pin 15
V_{SS} = Pin 8
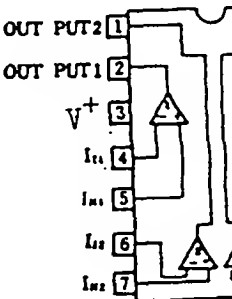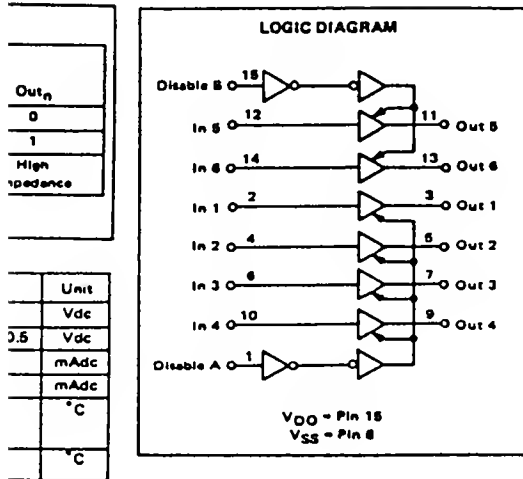
HD14013B
Dual Type D Flip Flop

INPUT				OUTPUT	
Clock*	Data	Reset	Set	Q	$\overline{Q}$
⟋	0	0	0	0	1
⟋	1	0	0	1	0
⟍	×	0	0	Q	$\overline{Q}$
×	×	1	0	0	1
×	×	0	1	1	0
×	×	1	1	1	1

(Top View)

V_{SS}

TA7179P

I5V TRACKING RAGULATOR

(Top View) VOLTAGE ADJUST

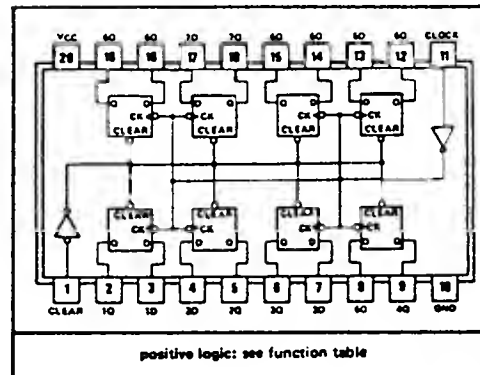|			
	1	14	NC
E			— COMPEN
EN			— SENSE
E			— VOUT
			NC
	7	8	VEE
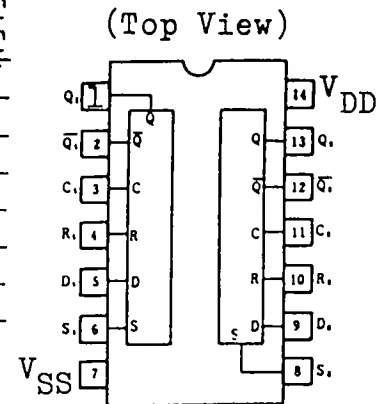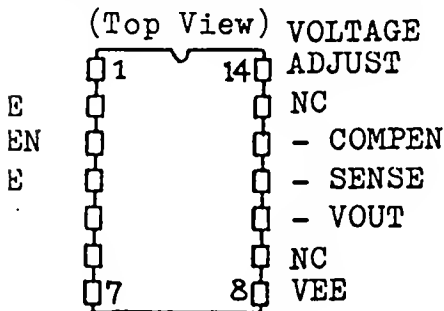
g.IN = 5mV(typ)(VIN=18-30V)
g.OUT= 5mV(typ)(IOUT=0-50mA)
pple rejection ratio = 75dB
tput current = 100mA (max)

N74LS273
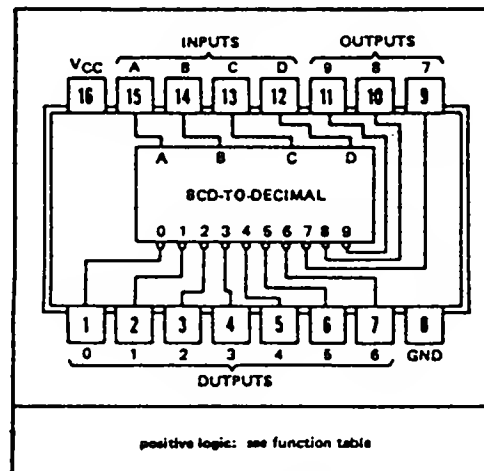### OCTAL D-TYPE FLIP-FLOP WITH CLEAR

(Top View)

positive logic: see function table

FUNCTION TABLE
(EACH FLIP-FLOP)

INPUTS			OUTPUT
CLEAR	CLOCK	D	Q
L	X	X	L
H	↑	H	H
H	↑	L	L
H	L	X	Q_0

PC177C, AN6912
Quad Comparator

Connection Diagram
(Top View)

1		14	OUT PUT3
2		13	OUT PUT4
3		12	GND
4		11	I_{n4}
5		10	I_{n4}
6		9	I_{n3}
7		8	I_{n3}

N7445
BCD-TO-DECIMAL DECODERS/DRIVERS

(TOP VIEW)

positive logic: see function table

FUNCTION TABLE

NO.	INPUTS				OUTPUTS									
	D	C	B	A	0	1	2	3	4	5	6	7	8	9
0	L	L	L	L	L	H	H	H	H	H	H	H	H	H
1	L	L	L	H	H	L	H	H	H	H	H	H	H	H
2	L	L	H	L	H	H	L	H	H	H	H	H	H	H
3	L	L	H	H	H	H	H	L	H	H	H	H	H	H
4	L	H	L	L	H	H	H	H	L	H	H	H	H	H
5	L	H	L	H	H	H	H	H	H	L	H	H	H	H
6	L	H	H	L	H	H	H	H	H	H	L	H	H	H
7	L	H	H	H	H	H	H	H	H	H	H	L	H	H
8	H	L	L	L	H	H	H	H	H	H	H	H	L	H
9	H	L	L	H	H	H	H	H	H	H	H	H	H	L
INVALID	H	L	H	L	H	H	H	H	H	H	H	H	H	H
	H	L	H	H	H	H	H	H	H	H	H	H	H	H
	H	H	L	L	H	H	H	H	H	H	H	H	H	H
	H	H	L	H	H	H	H	H	H	H	H	H	H	H
	H	H	H	L	H	H	H	H	H	H	H	H	H	H
	H	H	H	H	H	H	H	H	H	H	H	H	H	H

H - high level (off), L - low level (on)

HD14011B

Quadruple 2-input NAND Gate

(Top View)
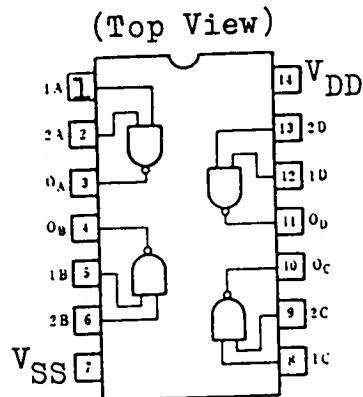
HD14584B

Hex Schmitt Trigger

(Top View)
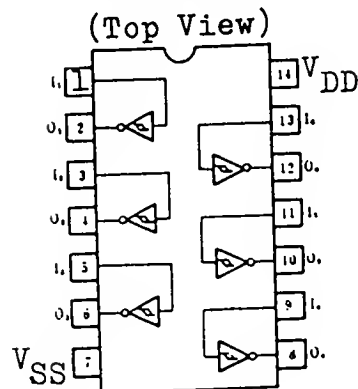
HD14023B

Triple 3-input NAND Gate

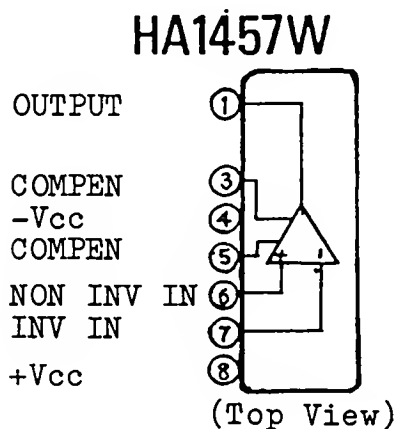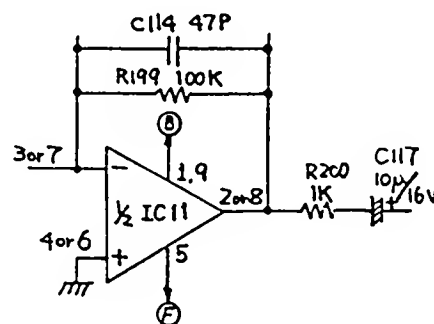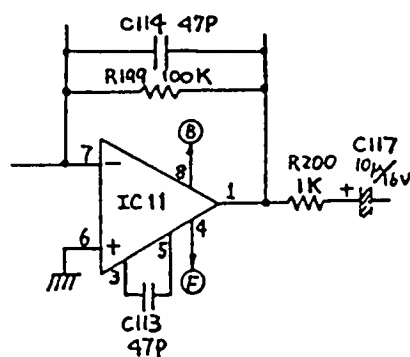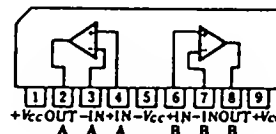(Top View)
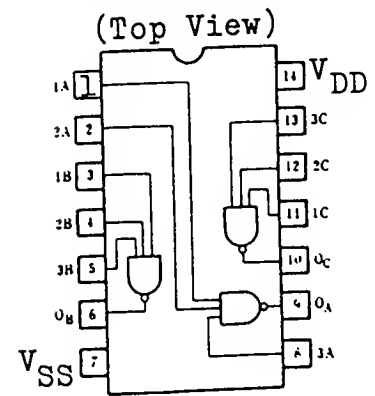
VOICING BOARD   CHANGES
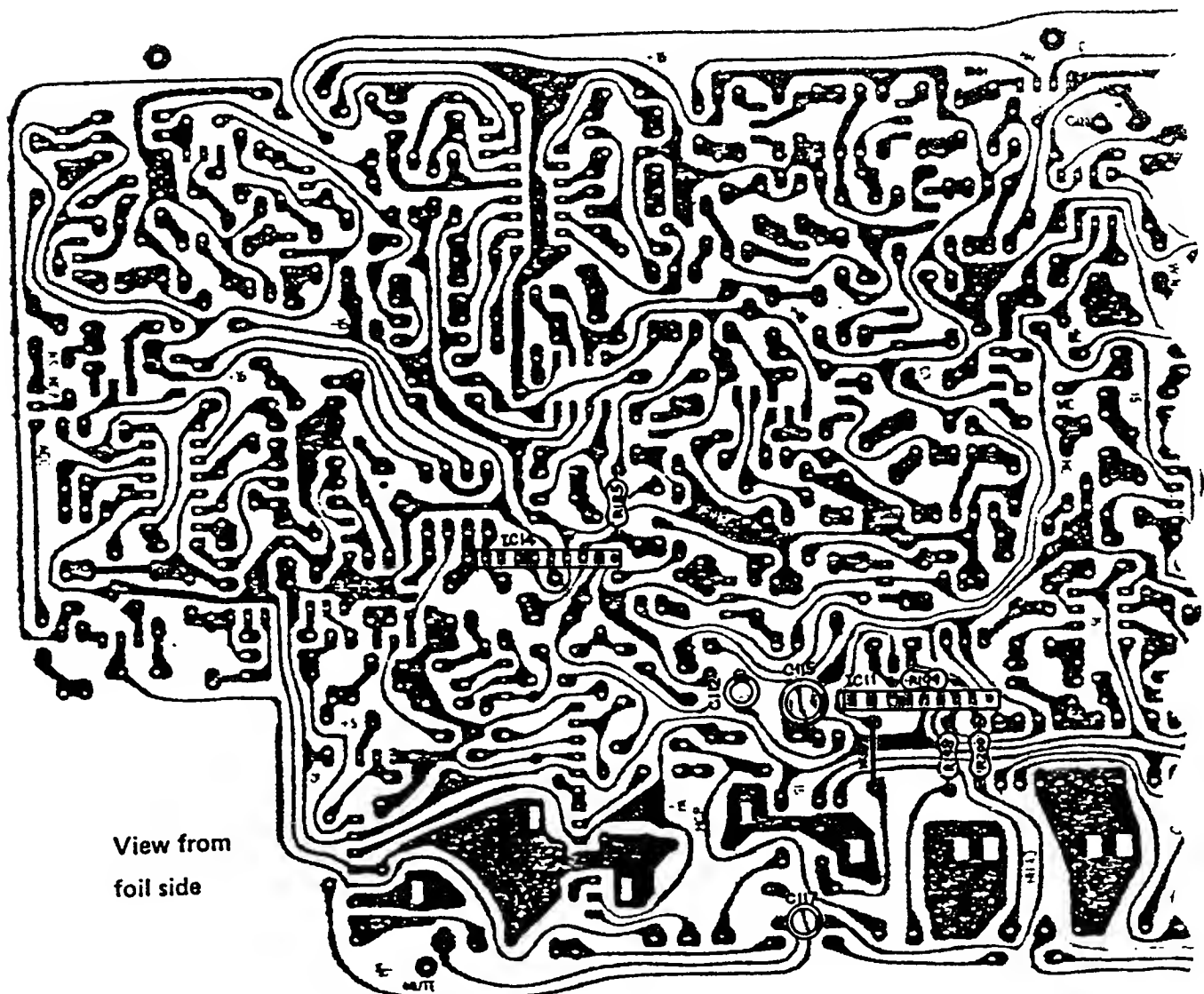
View from
foil side

CHANGING OPERATIONAL AMPLIFIERS

On CR-5000/8000 VG Boards as well as in other Roland products, the IC NJM4558S replaces HA1457W which is discontinued at the semiconductor manufacturer.

Incompatible pin arrangement leads to minor PCB re-layout as shown below, which is due to put into practical production.

Serial Numbers with which the change is effective on the CR-5000/8000 are not fixed as of the date this edition is closed.

NOTE: Although two OP AMPs are contained in new IC, one is left redundant in this application.

HA1457W

OUTPUT ①

COMPEN ③
-Vcc ④
COMPEN ⑤
NON INV IN ⑥
INV IN ⑦
+Vcc ⑧

(Top View)

NJM4558S

1	2	3	4	5	6	7	8	9
+Vcc A	OUT A	-IN A	+IN A	-Vcc	+IN B	-IN B	OUT B	+Vcc

C114 47P
R199 100K
IC11
R200 1K   C117 10μ/16v

½ IC11
R200 1K   C117 10μ/16v
3or7   ⑧ 1,9   2or8
4or6   5
Ⓕ

HA1457W

C122 47P
R213 150K
IC14
C112 1/50V

NJM4558S

C122 47P
R213 150K
½ IC14
C112 1/50V
3or7   ⑧ 1,9   2or8
4or6   5
Ⓕ